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About three quarters of the space is devoted to original papers, and the remaining quarter to a systematic report on the progress of ophthalmology, and to reports of societies, book reviews, and miscellaneous notes, all of it original.

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ARCHIVES OF OPHTHALMOLOGY.

AUTOGENOUS ONE-PIECE EPITHELIAL GRAFTS FOR THE RESTORATION OF THE EYELIDS[1]

By Dr. EDWARD B. HECKEL, Pittsburgh, Pa.

(With six illustrations on Text-Plates Nos. IX. and X.)

WHILE the present communication may contain little that is new or original yet the writer feels justified in presenting or repeating a technique which has served him well during the last ten or fifteen years. It was the writer's privilege to present a communication upon the restoration of the eyelids to this section, when our State Society met here in Philadelphia some years ago, detailing the technique and reporting several cases; since then it has been the writer's privilege to further demonstrate and improve the technique and good results described at that time. In addition to all this, the present time seems especially fitting to call your attention to the correction of a deformity which may, in the near future, be decidedly more common than in the past.

In the natural course of our industrial life, for peace hath its victims no less than war, it is not uncommon for accidents to result in more or less destruction in facial contour. Eyelids are torn, lacerated, and often destroyed as the result of burns.

Fortunately these burns, while severe, as a rule destroy the

[1] Read before the Section on Eye, Ear, Nose, and Throat Diseases, Medical Society of the State of Pennsylvania, Philadelphia, Pa., September 24, 1918.

skin and a portion of the substrata only, leaving the underlying muscles intact. The real deformity results from the immense contraction following the skin destruction, producing an eversion of the conjunctiva and a constant and persistent exposure of the eyeball, which, if not corrected, will result in a destruction of the transparency of the cornea and in an eventual loss of vision and often of the eyeball itself.

The problem then becomes a very simple one, for all that is necessary is to so separate the resulting cicatrix as to expose and replace the contracted muscles to their former position, cover them with an epithelial layer to keep them so, and the desired result is obtained, not only a restored lid, covering and protecting the eyeball, but a normally functionating lid responding to all the physiological movements of the normal lid. While this statement is perfectly true in every respect, the real problem is to so cover the defect that when the final shrinking or contraction in the graft has taken place it will be sufficient. In the previous communication, already referred to, the writer drew especial attention to the immense shrinking which takes place in these grafts, and again emphasizes it now, for good results depend entirely upon how adequately this shrinking has been anticipated.

The choice between an epithelial graft and a whole-skin graft or transplantation with or without a pedicle, in cases such as these, needs no argument, the facts speak for themselves; the epithelial graft results in a thin pliable skin surface, which in some instances, especially in the negro, can scarcely be distinguished from the surrounding normal skin, while the whole-skin transplantation or graft is more or less thick, bulky, and in itself a deformity.

The routine followed in these cases is as follows: On admission to the hospital, preparatory to the operation, the patient is given a full bath, the head is shampooed, and the face is ordered to be carefully washed with rather warm water and soap three times daily for three days. The patient's alimentary tract is looked after and his diet is restricted. The skin of his arms is carefully inspected. The one showing the cleanest skin, free from defects, etc., is the one selected from which the graft is to be taken. This arm is then ordered to be "scrubbed" daily for three consecutive days with

ILLUSTRATING DR. HECKEL'S ARTICLE ON "AUTOGENOUS ONE-PIECE EPITHELIAL GRAFTS FOR THE RESTORATION OF THE EYELIDS."

FIG. 1.

After dissection, overcorrecting deformity so that lower lid is carried over upper lid and held in place by sutures.

FIG. 2.

Denuded area covered with skin graft.

the "scrubbing" of the face, and after each scrubbing with hot water and ethereal soap and a rinsing with alcohol, the arm is covered with sterile gauze and bandaged. The final or third bandage is allowed to remain until the graft is to be excised or shaved off. On the fourth day the patient is ready for the operation. During the preparation neither the eye nor the face is covered at any time with a dressing. If the exposed conjunctival surface is dry or irritable a bit of bichloride vaseline 1:3000 is applied several times daily to keep it moist.

A general anæsthetic is used as it is very desirable to have all the muscles thoroughly relaxed. Ether is the anæsthetic of choice and during the administration of this the eyes are carefully covered with sterile gauze.

The operation conveniently divides itself into the four distinct stages:

1. Dissection of the lid so as to expose and prepare the underlying muscles.
2. Fixing the lid in a stretched position by anchoring it with several guy sutures.
3. Excision of the graft.
4. Placing of the graft in position, dressing, and bandage.

The first incision is made parallel with and about 3*mm* from the lid margin, or if this has been destroyed, from the conjunctival border, cutting just deep enough to cut through the skin or scar tissue, and extending it along the entire length of the lid or at least well beyond the point of eversion.

This gap is carefully widened by dissecting superficially the skin beyond and through the entire length of the incision. The lid margin is then grasped and pulled up or down as the case may be, up if a lower lid, down if an upper lid, and the dissection carried on till the lid can easily be stretched to a point far beyond the requirements of the lid, so that the middle part of the lid margin can be placed as far above the normal line as it was below it in its preoperative state. (See Figs. 1 and 2.)

The bleeding from the raw surface is easily controlled; if there are any small spurting points these can be grasped and twisted slightly with small artery forceps, the general oozing yields promptly to a few hot wet pads.

There is of course a decided redundancy in the length of the

lid margin, depending upon the case; sometimes the length is increased to almost twice that of normal or what it originally was. This increase is simply the result of a stretching process and nature takes care of it very nicely after the operation and it should never be interfered with; that is, to attempt to excise a V-shaped piece is absolutely wrong and should never be done. The final shrinking takes care of this as will be illustrated by pictures shown.

The second step in the operation consists of stretching and anchoring the lid. A strong silk suture is used for this purpose with a needle at either end. First one needle is passed through the middle of the lid at the greatest width of the defect to be covered, by passing the needle parallel with the plane of the lid from the raw surface at about the middle of thickness of the lid margin; the other needle of the same suture is passed in a like manner about 3*mm* from it. One needle is now unthreaded and the other, after holding the suture taut and putting the lid on a stretch, is passed either in the forehead or upon the cheek, depending if it is the upper or lower lid, and the two ends tied so as to hold the lid stretched. In addition another similar guy suture is inserted on either side so as to put the entire lid upon a stretch. This is then carefully covered temporarily with a wet pad of cotton. (See Fig. 2.)

The third step consists of excising or shaving off the epithelial graft.

The dressing is removed and the prepared arm exposed. It is again washed with hot water and ethereal soap, flushed with alcohol, and finally copiously douched with warm normal salt solution.

The arm is firmly held by an assistant. In order to put the skin surface on a stretch and flatten it so as to facilitate the removal of the graft, two pieces of wood are used; one is held by an assistant, the other by the operator. These pieces of wood are 2½ by 5 by ¼ in. and have been previously sterilized by boiling. The graft is then shaved off by means of an ordinary razor, rather broad and sharp. The blade is held parallel with the surface of the skin and is so directed as to shave off a thin section only, just cutting off the papillæ of the true skin. With a little care, it is quite a simple matter to get a one-piece graft of more than sufficient size to cover the defect. The

excised graft is immediately placed in a warm normal salt solution. The raw surface on the arm is dressed by placing over it a sterilized piece of gauze, over which some bichloride vaseline 1:3000 has been smeared and which is confined by means of a roller bandage. This dressing is not disturbed for several days, after which it is redressed at intervals of a few days. Healing and epithelialization is quite prompt and perfect, so that little or no scar remains.

The fourth step is the placing of the graft. The raw surface is now again exposed and should be dry, clean, and free from any bleeding.

The graft is now carefully spread out over the raw surface to be covered and carefully pressed into place. The portions extending beyond are carefully excised with small sharp scissors, being careful to allow a little overlapping, in other words the graft should be just a bit too large all the way round. (See Fig. 2.) The graft is then covered with a piece of gutta-percha tissue, cut so as to be a little larger than the graft and perforated at a number of places by nicking with scissors. A bit of wet cotton is now carefully molded into a shape as large as the gutta-percha tissue and about a quarter of an inch thick, being careful to get it of an even thickness; this is then carefully placed over the gutta-percha tissue. Then this is covered with a piece of gutta-percha tissue without perforation, so as to prevent the underlying cotton pad from drying out too soon, which is in turn covered with a pad of sterile gauze slightly larger than the other pads; then this is held in place by a few adhesive strips so as to prevent any slipping during the placing of the rest of the dressing and bandage; over this is placed a rather large pad of sterile gauze about 2½ by 5 inches and over this a similar pad of cotton; the ear on the corresponding side is protected by cotton and the whole confined by means of a two-inch roller bandage, carefully but firmly applied by including the ear.

It is very important to apply the roller bandage with care as it is very essential, in fact it is absolutely necessary, to so apply it that the bandage will not slip.

This dressing is allowed to remain from four to seven days. If the patient is comfortable, the bandage nicely in place, and no odor, it is better to let it remain six or seven days. The

chief essential for the taking of the graft is that it be held firmly and evenly in place.

At the end of from four to seven days the dressing is carefully removed and carefully washed off with a warm normal salt solution. At the same time the conjunctival sac can also be flushed out some. If the guy sutures are still in place (sometimes one or more are found to have cut through the lid margins) they may remain for another day or two, but not longer. The second dressing should be done in the same manner as the first and daily thereafter for three or four days, after which the bandage may be omitted and the graft thoroughly covered with bichloride vaseline 1:3000 and the entire area protected by a wire gauze protector.

The eye is flushed and cleansed once daily thereafter for about one week when the wire gauze protector may be omitted. The bichloride vaseline is continued however and when the patient leaves the hospital after about two weeks he is given some bichloride vaseline 1:3000 and asked to anoint and massage the grafted surface several times a day; this is continued for some weeks.

From the description of the technique it goes without saying that when both eyelids are involved the operation must be divided, as it is impossible to attempt to restore both lids as the result of one operation.

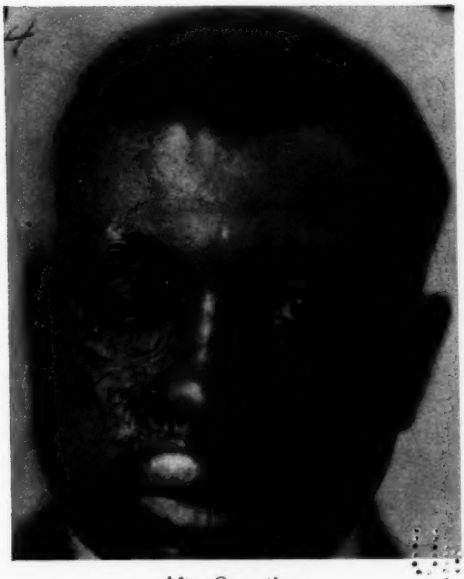
The cases shown in the accompanying pictures serve to illustrate the paper.

ILLUSTRATING DR. HECKEL'S ARTICLE ON "AUTOGENOUS ONE-PIECE EPITHELIAL GRAFTS FOR THE RESTORATION OF THE EYELIDS."

Before Operation.

After Operation.
Operation done December, 1914.

Before Operation.



After Operation.
Operation done April and May, 1917.

REVOLVER BULLET INJURY OF BOTH ORBITS WITH MANY EYE SYMPTOMS. PRESERVATION OF VISION IN ONE EYE, THAT OF THE OTHER REMAINING USEFUL, BUT BELOW NORMAL.

By Dr. JAMES A. SPALDING, Portland, Maine.

IT may seem hardly worth while with so many much more interesting accounts coming from overseas of cases of bullet injuries of the orbits, with all their manifold symptoms, to publish in the ARCHIVES just a single instance of such an injury occurring in civil life. But as this single instance offered some unusual symptoms and ophthalmoscopic appearances, and has been observed for verification off and on for several years, it really seems as if it ought to be published in order to add one more to the list of cases already available. In due season we shall have the pleasure of reading a complete surgical history of all the orbital bullet injuries occurring during the Great War, so that it is unnecessary in this brief paper to tabulate the bibliography of other similar cases already published in scattered papers of the past. For all of those, too, will undoubtedly find a place and a mention in the new war histories sooner or later to be printed for reference and careful consideration and study. A brief suggestion, however, concerning the ultimate results in some of the civil injuries of the orbits already reported will find mention for the reader as he proceeds.

A young fellow was tossing carelessly from one hand to the other, and even throwing into the air and catching with either hand as it fell, a small caliber pocket revolver with five chambers. A bystander remonstrated with him for being so careless, but he replied: "Oh, that is nothing. I know that I can catch it every time that it falls and with either hand any time, and beside that, it isn't loaded. Just look at me."

So saying, he put the muzzle against his right temple, and pulled the trigger. Instead of the mere dull click of the hammer on the breech or on an empty cartridge, there was an explosion, the man fell to the floor shrieking hysterically, became unconscious, and after first aid had been given by a local physician, he was carried to a hospital. An X-ray picture was taken the next morning, and as it was a partial failure, another was taken and at this second attempt a small caliber bullet, somewhat stripped of lead so that it appeared smaller than when it entered the orbits, was discovered in the left orbit, very deeply seated and tilted on its larger end.

When the patient finally came to his senses he began to exhibit various eye symptoms, and it fell to my lot to be called in, in consultation with the attending physician.

I found the patient very hysterical, fearing blindness, and very difficult to manage, but by gentle persuasion he became after a day or two, more tractable, and I was finally able to make out the following state of affairs:

First, was the small circular temporal wound where the bullet had entered and surrounded by many tell-tale grains of unexploded powder showing the closeness of the muzzle of the revolver to the skin when fired. This aperture I may say soon healed over and required no surgical care at all.

As to the eyes the first striking symptom was excessive œdema of both lids of both eyes, although more marked in the lids of the right eye than of the left. It was with difficulty that the lids could be held apart, at all, with the fingers of the attending physician. Once partially opened, the eyeballs appeared to be protruded somewhat, the right eye more than the left. The œdema and the protrusion of the eyes were attributed to an abundant orbital hemorrhage. As the œdema gradually decreased, it was noticed that the patient could only look upward by throwing back his head, all motion of the eyeballs upward being impeded by the swollen condition of the lids.

As this œdema gradually decreased and finally ceased within a week, further observations were made as follows:

The conjunctivæ exhibited a curious subconjunctival hemorrhage in each eye, that on the right eye being limited very accurately to the course of the sheath of the external rectus,

and extending backward in ribband shape out of sight in the orbit no matter how far the eye was turned in toward the nose. The hemorrhage in the left eye was limited partially to the sheath of the external rectus, as in the other eye, but there was, additionally, a considerable hemorrhage above the cornea. These two hemorrhages on the left eye it may be said, in passing, gradually decreased in size and coloration, and gradually disappeared from view, as they invariably do, but that of the right eye lasted several weeks before it was finally lost to sight.

The cornea of each eye was transparent but totally anæsthetic; both pupils were dilated, the right, ovally upward and responsive to light, the left, widely circular and not responsive to light in the least. Pilocarpin and eserin, 1%, caused each pupil to contract to minimum but the left pupil widened again ad maximum and has remained larger than the right in the several years since the patient was first examined. The corneal anæsthesia diminished rapidly as a symptom.

The media were transparent in both eyes.

As the patient complained bitterly of seeing everything double, and confused, examinations in that direction were made as soon as the lids could voluntarily be opened to ordinary width, the eyes being covered with red and green lenses, respectively. The images were thus brought out distinctly when tested with a candle, and they revealed the symptoms of paralysis of the left inferior oblique, as prefigured in the textbooks on the eye muscles. During these tests, also, a defect in the visual field in the left eye was discovered, the patient expressing himself to this effect: "If I shut my left eye and look at you as you stand there at the foot of the bed I can see you plainly and all over, but if I close my right eye and look at you with my left eye, I can only see your body and the upper part of your face about as high as the lower rim of your spectacles. Above that, everything is blind to me."

In two weeks from the time that this visual field defect was first noted it had practically ceased so that the two eyes were in that respect about alike.

We come now to the curious part of the case, the extraordinary ophthalmoscopic appearances which were very clearly defined owing to the perfect transparency of the media.

The papilla of the right eye was normal as to contour and

vessels, but directly above it and of about the same diameter and attached to it was a circular white exudate through which the vessels could be plainly seen. It was about two thirds of the papilla diameter and as white as the exudates shown in Lagrange's recent pictures in his work on orbital injuries during the war. Directly below the papilla was a larger exudate also very white and shiny which covered the vessels emerging from the papilla entirely out of sight, those on each margin of the exudate being just visible. One of the veins on the margin was exceedingly large and tortuous. There were a few minute retinal hemorrhages in this eye only.

The exudate on the left papilla was like that on the right, but smaller and only visible above. Below, the retina was normal without any exudate.

It was soon noted that the exudate was decreasing in thickness, in that the hidden vessels began to come into sight, to emerge, as may be said, so that after some months they were all plainly visible.

A year later the exudate in the right eye was about one third of its former dimensions and all of the vessels could be easily followed as they emerged from the papilla. The exudate in the left eye had disappeared entirely. The sight of the right eye as repeatedly tested was perfect and there was no scotoma discoverable. The sight of the left eye was about $\frac{20}{30}$ and has remained so in spite of lenses. The patient rather likes concave 50 D.C. axis 180° when moto.ing, for right eye, and concave 1 D. S. with concave 75 D. C. axis 180° for O. S., as his eyes feel better with such a combination; yet often he wears no lenses at all.

The visual field contraction gradually ceased, so far as the left eye was concerned, but there has remained up to date a "break" in ordinary type. In other words, as he reads a long word with the left eye alone, closing the right, three letters ahead are clear and on the level, as set, but the fourth letter and the fifth keep on running ahead out of sight by being lifted up like a caterpillar as the patient mentions repeatedly. With both eyes open this is not noticed. For a long time the patient exercised the left eye alone hoping to obtain by exercise or practice a cessation of the "break" in reading type with the left eye alone, and utilized convex 2 D. S. with convex 75

D. C. axis 90° as most suitable but without avail. After a year of daily practice he gave it up as impossible to obtain perfect sight with the left eye.

To go back to the treatment of the case, the patient was kept abed to quiet his nerves and to diminish his hysteria, which for several weeks was very considerable but which finally ceased. The myotics were continued until it seemed hardly worth while to use them longer. Galvanism was used freely to the eyelid as it seemed to improve the œdema and to improve the paralysis. Hypodermatic strychnia was given and good food; and finally exercise with glasses so that after a long series of experiments the final result was: Vision, O. D. normal and Snellen diamond without lenses. O. S. vision without lenses $\frac{20}{80}$ hardly much improvement with concave spherical 75 with concave cylinder 50 axis 180° and for reading occasionally for practice Snellen 12 with + 75 D. S. ⊃ 50 D. C. 90°. Binocular vision perfect, no diplopia.

Much might be said from a literary point of view of instant death, unilateral blindness, total blindness, evulsion of the eyeball, extrusion of the eyes, divergent strabismus, paralysis of the facial nerve, Argyll-Robertson pupils, choroidal rupture, detachment of the retina, hole at the macula, choked disk, optic atrophy, loss of smell, and other symptoms mentioned in former papers bearing upon the topic of injuries from projectiles. All of these will, however, probably be detailed in books already underway for publication. Each case must invariably stand on its own merits, and will be dependent largely upon the caliber of the bullet, and the precise point of entrance. The ultimate excellent result in the present case is undoubtedly due to the small-caliber bullet, and the light charge behind it. It was a most fortunate result from every point of view, and taught the patient a lesson which he is not likely ever to forget.

The two points of interest here presented are: the ocular paralysis, and the exudates, larger in the eye nearer the point of entrance of the projectile, and diminishing in extent and density after a series of years.

It might be asked, in such cases, if the bullet once located, should be removed and the reasonable answer would seem to be to let it alone so long as it does no harm. To this idea I

have adhered, and after some years nothing has been heard from the missile in any way. It might be worth while to make at this late date, a fresh X-ray picture, but the patient would probably resent the suggestion, having had enough of his rashness to last for life.

EXTIRPATION OF THE LACRIMAL GLAND FOR THE RELIEF OF EPIPHORA.[1]

By Dr. CHRISTIAN R. HOLMES, Cincinnati, O.

WHEN your Chairman was kind enough to invite me to attend your meeting this evening and participate in the discussion of the problems connected with lacrimal obstruction, and the method of relieving the tearing which unfortunately continues in so many of the cases, he also asked that I relate my experience in removing the lacrimal gland,—I replied that on account of my duties at Camp Sherman as Chief of the Section of Head Surgery and as my private hospital-residence and library had been closed for almost two years, I had not the facilities nor the time to prepare a paper bringing the subject up to date, but that I would gladly give my past experience.

If you agree, that the result of an operation when demonstrated years after it was performed is of greater value than those reported soon after the operation, then these cases ought to prove the value of the extirpation of the lacrimal gland,—indeed it seems almost ancient history, when you consider that I made the first operation in 1890—more than twenty-eight years ago; and I still see some of the first cases now and then and all have remained cured.

It pleases me that Dr. Arnold Knapp is present this evening for it was his distinguished father who, many years ago, when going to attend a meeting in Chicago, came to Cincinnati to see some of the cases I had operated upon. In 1899 I published an article in the Archives on the extirpation of the lacrimal

[1] Read by invitation at meeting of the Section on Ophthalmology, New York Academy of Medicine, April 21, 1919.

sac and gland. So far as I know, none of my confrères adopted the operation, although judging by the number of letters I received it created widespread interest.

From De Wecker in Paris, I received a four-page, closely written letter, arguing against the removal of the large gland, and asking that I try out his method of only removing the small or accessory glands;—which I did with very imperfect results, and so reported to him. In presenting the subject to you this evening I shall read extracts from the above mentioned article—omitting where possible everything pertaining to the lacrimal sac and confining my remarks entirely to the gland.

The extirpation of the lacrimal gland when diseased dates back to the early days of surgery, and the removal of the healthy gland was advised but not practiced by Paul Bernard for the relief of tearing, where the canal was hopelessly obliterated.

H. Haynes Walton, Surgeon to the Central London Ophthalmic Hospital, wrote in 1835: "Extirpation of a healthy lacrimal gland may be required when the natural channels that convey away the tears are lost."

Lawrence advocated and practiced the extirpation of the lacrimal gland in 1867.

Darrier, in *Gaz. med. de Paris*, 1886, recommends extirpation of the accessory lacrimal gland in cases in which epiphora cannot be checked, or in which the permeability of the sac cannot be restored.

De Wecker, in 1889, reported the extirpation of the palpebral gland in twenty-five cases.

Truc, in *Arch. d'opht.*, xiii., 1893, writes on cases of extirpation of the accessory or palpebral lacrimal gland in simple and obstinate lacrimation.

Terson, *Arch. d'opht.*, xiii., 1893. On the extirpation of the palpebral lacrimal gland.

Terson, *Arch. d'opht.*, xvii., 1898. Comparison between different cases of extirpation of the palpebral lacrimal gland.

Fuchs, in his edition (1898), speaks of the extirpation or destruction by caustics of the lacrimal sac, but refers only casually to the removal of the gland after stating that the moisture of the globe does not entirely depend upon the lacrimal gland, but that the conjunctival as well as the Krause-

Waldeyer mucous glands participate in keeping the eyeball moist.

H. D. Noyes. Under the heading of "Tear Gland" he states: "The gland may be the seat of neoplasms, such as sarcoma and other tumors, and of cystoid degeneration, and is liable to chronic hypertrophy; but these conditions need no special consideration. Its extirpation to cure epiphora was practised by Lawrence, but is not now approved."

From the foregoing we observe that the removal of the lacrimal gland while attempted by a few operators was entirely abandoned. The operations upon the gland reported by De Wecker and Terson were limited to that irregular aggregation of small nodules of gland tissue found under the upper lid, very variable in size, and called the secondary gland, which (or as much of it as can be found) can be removed under cocaine anæsthesia; the patient being directed to roll the eye downward and inward, when eversion of the upper lid will in some, but not all cases, bring into prominence the palpebral portion of the gland, which appears as a small irregular swelling. To me it appears more rational to remove the gland, which supplies at least 90 per cent. of the tears, leaving, if desired, the secondary gland to furnish a small quantity of fluid to dilute the mucous secretion, although even this is not necessary for the comfort of the eye.

The reason for abandoning the removal of the orbital gland can no doubt be attributed to failures, and one can readily understand how, before the days of aseptic surgery, there was much danger accompanying an operation which freely invades the tissues of the orbital cavity; for if an inflammation should develop in such a wound as is produced by the extirpation of the gland, it would be very likely to lead to orbital cellulitis, with strangulation of the optic nerve and vessels, and loss of vision if not of the globe.

I believe that we may safely state that, with strict attention to asepsis, the dangers from infection can now be entirely eliminated, and the results, both immediate and remote, are so highly satisfactory that I can see no reason why the operation should not be resorted to in all suitable cases. (I wrote this twenty years ago—to-day one can't conceive of an infection taking place at the hands of a reputable surgeon.)

An operation which only obliterates the canal without cutting off the annoying supply of tears which torments the patient for the rest of his life, is to my mind a very incomplete piece of surgery.

Extirpation of the Lacrimal Gland.—I formerly shaved two thirds of the eyebrow, and drew down the skin, so that while the incision was made along the margin of the orbit, the skin when allowed to recede brought the cut along the center of the eyebrow. The wound, however, leaves only a delicate scar, which soon fades entirely; while the eyebrows are of such slow growth that now I do not shave the brow, but make my incision below, along the margin of the orbit cutting against the bone, the incision beginning near the center of the upper orbital arch, and, following the bony margin, is carried to a point about 3*mm* below the outer canthus; it will be seen from the figure where the course of the arteries and veins are outlined after Merkel, that we escape nearly all blood-vessels by following this line, so that hemorrhage, as a rule, is very slight. The fascia or septum orbitale is cut through along its attachment to the orbital margin. It is at this point that confusion is likely to arise for the beginner. In the living, the resemblance between the orbital fat and the gland is sufficient to cause confusion, especially if the field of operation is slightly obscured by hemorrhage. The normal color of the gland which authors speak of as rose-red, I have not encountered; those which I have seen were of a delicate pinkish yellow, especially by electric light. This wedge-shaped mass of fatty tissue, a prolongation of the orbital fat, and varying in size in different individuals and according to age, comes down from under the edge of the orbit. Should the fatty tissue be present in the wound, it can be held to one side with retractors. Bleeding points from the edges of the wound must be controlled so as to leave a perfectly clear field for operation. The relation of the anterior edge of the gland to the bony margin of orbit varies slightly; in some the gland presents one to two millimeters below, but the most frequent position is two to three millimeters upward and backward from the edge of the bony orbit. There is a thin but distinct layer of fascia between the superior and inferior gland, which hides the latter from view. Care should be exercised

not to displace the orbital contents unnecessarily. The gland tissue is quite friable, and in order to be positive that nothing is left behind to invalidate the success of the operation, much care must be used in dissecting it out in its entirety. This is difficult at the edge most deeply imbedded in the orbit, where the gland is very intimately connected with the orbital fat and connective tissue. The ducts upon the under surface of the gland also offer some resistance. By means of a slender, blunt-pointed pair of scissors, broad fixation forceps, small knife, and a pair of tenotomy hooks, one can with some patience dissect out the gland with but little change of its shape, thereby assuring the operator that the extirpation is complete.

If, in addition, we desire to remove a portion or all of the palpebral or secondary gland, a blunt instrument is passed through the palpebral fissure and the conjunctiva over the seat of the gland pushed by the assistant up into the wound, where the small nodular gland-masses mentioned above can be dissected out. One should avoid perforating the ocular conjunctiva, thereby lessening the danger of infection from the tear-sac wound. I have never encountered severe hemorrhage, but that such may occur with total loss of the eye has been reported by Dr. H. Gifford, in the *American Journal of Ophthalmology*, 1889. I do not close the wound until all hemorrhage (excepting a slight venous oozing) has ceased. The wound is closed by two deep and three or four fine superficial silk sutures, covered with sterilized gauze and cotton, and pad fixed with stripe of isinglass plaster. Both wounds, *i.e.*, the sac and gland, are then covered by a large pad of gauze and cotton, held in position by a roller bandage; unless there has been extensive suppuration of the tear sac with necrosis of bone, the dressing is not disturbed for three or four days, when some or all of the stitches are removed, depending upon the condition found.

CASE 1.—Until 1890 I followed in the footsteps of my teachers and never dreamed of removing the lacrimal gland, fearing serious results to the eye, but in that year C. G. T., age 17, with congenital dislocation of both tear glands presented herself in my consulting room with the following history: Had always noticed fullness of skin over seat of glands. At the age of thirteen years, when menstruation

began, the fullness over the glands became more marked, associated with varicosity of vessels. The skin over the swelling was much thinner than normal; the tumor was soft, with tendency to bag; lying loosely within it one could feel the gland, which was of normal size; the lower half of it could readily be grasped between the fingers, and slight pressure caused it to slip from between the fingers and disappear under the roof of orbit. When the patient was excited, or when exercising, dancing, or at the time of her menstruation, the swelling would become so engorged as to almost resemble a nævus, disfiguring her and causing comment. Tear sac and eyes normal. No abnormal lacrimation, but patient demanded an operation which would relieve her of the annoying symptoms described. I refused, fearing a dry eye—but she returned and insisted on an operation stating she would take her chances of a good result. The absence of any ill effect upon the eyes after the operation made me determine to remove the lacrimal gland in all cases where the canal was obstructed or the sac removed in order to cure the annoying epiphora. I proceeded to study the best methods, by operating on a number of cadavers; the drawings in my first article (these ARCHIVES, 1899) are from fresh dissections upon a subject secured three hours after death.

Operation. Oct. 23, 1890. Ether anæsthesia. Removed the right gland and excised a portion of the redundant skin. There was very free hemorrhage from the superficial vessels. Closed wound with eight sutures. Dressing and stitches removed on third day. Primary union. December 9, 1890. The left eye was operated upon in the same manner as the right. Result perfect.

Cases of Extirpation of Both the Lacrimal Sac and Gland.

CASE 2.—*History.* John Seyler. Age nineteen.

Operation. Dec. 12, 1891. Chloroform anæsthesia. The right tear sac and gland were extirpated. No fever. Dressing removed on the third day. Union by first intention. The result was so satisfactory to the patient that he asked to have the left side operated, which I did Feb. 21, 1892, with the same result as on the right.

CASE 3.—*History.* T. N. Age forty-seven. Has suffered for years from purulent dacryocystitis and annoying epiphora, much aggravated by a severe form of chronic conjunctivitis secondary to the tear-sac infection. Exposure to wind, or light, as well as close application, caused free

lacrimation as well as difficulty in using the eyes. The primary cause of the tear-sac trouble was a severe infection of the naso-pharynx with extensive destruction of the septum and soft palate; periostitis had completely obstructed the bony portion of the lacrimal canal, so that treatment by probing was out of the question. Patient when seen was suffering from chronic sepsis; continuous fever ranging from 99° to 101° F. which I attributed to hidden bone necrosis, probably involving one or more of the accessory cavities, a surmise which afterwards proved correct, when I opened the sphenoid cavity and removed a large mass of dead bone from the anterior portion of the body of the sphenoid, this being followed by permanent cessation of the fever, which had lasted for over one year, and had been attributed to various causes, but chiefly "chronic malaria."

Operation.—April 23, 1892. Ether narcosis. Total extirpation of both lacrimal sacs. The operation did not cause any elevation of temperature above that from which he was suffering by reason of the chronic sepsis mentioned above. Union by first intention. Stitches removed on the fourth day. Pus having ceased to enter the eye, the chronic conjunctivitis yielded readily to treatment, but the lacrimation continued very troublesome, until on May 3, 1894, I removed both lacrimal glands. Stitches removed on the fourth day. Primary union.

I mention this case more in detail because the patient is a very prominent and learned man, for many years in the service of the Government, who suffered so severely from nasal necrosis, that I did not care to run the risk of infecting the tear-gland wound by operating on both sac and gland at the same time, as I have done in all the other cases—but always extirpate the sac first, seal it, and disinfect the face, especially the region of the orbit; operators and assistants and instruments must also be resterilized.

CASE 4.—L. K. Age nine. April 11, 1895, I removed both lacrimal sac and gland on the left side. Healed by primary union.

CASE 5.—Mrs. M. McG. Age fifty-four.

Operation.—March 10, 1896. Ether narcosis. Removed lacrimal sac and gland. Primary union of both wounds.

CASE 6.—Miss M. Age twenty-nine. The sac and gland both extirpated. Primary union. Stitches removed on the fourth day.

CASE 7.—*Status Præsens.* H. P. Age five. Child rachitic; teeth black and broken down; chronic purulent dacryocystitis with fistula of sac, left side; complete adhesion of soft palate to posterior wall of pharynx; double media purulenta, with total destruction of membrana tympani, and necrosis of ossicles in the right ear.

Operation.—February 19, 1897. Chloroform narcosis. Sac and gland extirpated. Primary union of both wounds. Notwithstanding his debilitated condition, suffering from severe nasal catarrh, double purulent otitis media, and having three distinct operations, to wit: tear sac, gland, and extraction of ossicles from middle ear, his temperature did not go above normal.

CASE 8.—*History.* C. K. Age thirty-five.

Operation.—April 2, 1898. Chloroform anæsthesia. Gland and sac removed. The latter much thickened. Healing by primary union.

CASE 9.—*History.* Mrs. M. Age forty-four.

Operation.—February 19, 1898. Chloroform narcosis. Removed the gland and the undestroyed upper part of the sac. Primary union of both wounds.

In the cases so far operated upon, I had only removed the large gland or orbital, but not the inferior or palpebral glands. Their complete extirpation is not always an easy proceeding, as in many cases the palpebral gland is nothing more than a varying number of minute round glands scattered irregularly in the tissue of the upper lid, and often very difficult to find. In this case, after removing the upper gland, which was unusually large, I searched for and removed as many of the nodules of the secondary gland as I could find, thus making as nearly as possible a complete extirpation; my reason for doing this being that in one of the other cases (No. 2), the secretion from the inferior or palpebral gland is, when the eye is irritated, sufficient to cause some annoyance, and as in this case the upper gland was unusually large and lacrimation very profuse, I feared that if left the secondary gland would secrete enough tears to become annoying.

CASE 10.—*History.* Prof. D. Age forty-eight. Patient gives history of suffering from affection of the left tear sac since he was one year of age. During all that time the tear sac has passed through numerous attacks of inflammation from slight to the most violent, resulting in perforation and a permanent fistulous opening. Passed through various

treatments at different times, till he finally became discouraged, and of late years had left it alone.

On Nov. 22, 1897, he consulted me and asked for the radical cure.

Operation.—March 23, 1898. Mixed anæsthesia. Extirpation of gland, but the sac was so diseased that it could only be made out in part. The skin over the sac was so friable and puckered by repeated inflammations that it became necessary to excise a portion of it. Through the excessive curetting necessary to bring away all of the diseased tissue, the lower lid became detached from its insertion at the inner angle and sagged away from the globe. Replaced by sutures; primary union, even over the sac, without any recurrent manifestations later on. I only mention this case as a type of several others, to show that it is perfectly safe to remove the gland at the same time that you clean up a badly diseased sac—if you use the proper precaution.

Résumé of Cases.—Brought up to May 15, 1898. Reports of surgical cases may, at the time of the operation and immediately after, appear very satisfactory, and yet the good result be transitory, time being the only valuable test. I therefore reëxamined all the cases, and have placed them below in the order they were operated upon.

CASE 1.—C. T. Double extirpation of dislocated glands in 1890. In response to my letter of inquiry, the following reply was received, which I take the liberty of quoting verbatim, as it expresses her feelings upon the subject uninfluenced by the doctor's opinions:

"CARTHAGE, KY., April 4, 1898.

"MY DEAR DOCTOR:

"Your letter came this morning. In return will say that the operation was a perfect success. My eyes are entirely well. They have never given me the slightest trouble since the operation, and I am very grateful to you. Will be in Cincinnati very soon, and will certainly call at your office.

"Yours very truly,

"C. G. T."

CASE 2.—Extirpation of both sacs and glands, 1891–92. Reëxamined April, 1898. Excepting upon careful examina-

tion, one fails to see line of incision. Eyes have never caused him any annoyance since the operation. Cannot weep, and only upon marked irritation is there slight amount of lacrimal secretion perceptible. Vision normal.

CASE 3.—Extirpation of both sacs in 1892, and of both glands in 1894. This is the only one of the cases where the operation has not given complete relief from tearing. Under strong irritation to the eyes, tears can accumulate in sufficient quantity to be annoying.

CASE 4. L. K. Extirpation of lacrimal sac and gland in 1895. Reëxamined April, 1898. The right tear sac, a fistula of which was closed by skin flap, has remained normal. The left eye has been normal since the operation. Vision unchanged. When crying, the left eye becomes slightly moist, but there is no overflow of tears.

CASE 5.—Lost from observation.

CASE 6.—Reëxamined April, 1898. Eye has been normal since she was discharged. Entirely free from epiphora; only strong irritation causes a perceptible moisture of the globe. Vision of operated eye normal.

CASE 7.—Reëxamined February 19, 1898. Eye normal since operation.

CASES 8, 9, and 10 are of special interest, because from Nos. 8 and 10 I removed, in addition to the large gland, some of the nodules making up the palpebral portion, and from No. 9, I removed all.

In the cases where both the orbital and the palpebral glands were removed, the eyes were carefully reëxamined after the operation, in order to see what changes, if any, had taken place, with the object in view of determining if, in addition to the removal of the superior gland, the removal of all, or even a portion of the secondary or palpebral gland, would still leave the eye sufficiently lubricated from the secretions of the mucous glands. In Case 9, on the sixth day after the operation, when my assistant was testing the patient, he found that the vision, which before the operation had been $\frac{1}{1}\frac{0}{0}$, was only $\frac{7}{1}\frac{0}{0}$. A careful examination of the eye revealed nothing abnormal excepting that one could detect a slight amount of mucus upon the cornea. He therefore flushed the eye with a normal salt solution, and found vision at once restored to $\frac{1}{1}\frac{0}{0}$. It was very evident that while the eye received enough lubricating fluid to make it feel comfortable, there was an insufficiency of the watery solution to keep the mucus from adhering to the corneal surface. She was examined from time to time and in two weeks the moisture had again become sufficient to keep the cornea clear of mucus, and vision was normal. This patient reported on June 1, 1898, by letter:

"LYONS FALLS, N. Y., June 1, 1898.

"My eye is a perfect success. . . . In behalf of suffering humanity surely the least I can do is to tell them to weep no more, but to obtain absolute relief by a radical operation."

CASE 10 gave the same result as above, but the return of sufficient moisture to keep the cornea free from mucus was much more rapid than in the former case; and examination of the eye on May 26, 1898, found it normal.

In the preparation of this paper I dissected fifty anatomical specimens cut so as to demonstrate the accessory cavities, lacrimal canal, and turbinated bodies (preserved in Wichersheimer's solution or alcohol).

I give the average measurements from all these specimens, showing the relation of the outlet of the nasal duct to the lower edge of the inferior turbinated, the floor of the nose, and the entrance to the nares as follows:

Outlet from floor of nose: greatest *22mm*, least *9mm;* average *16mm*.

Distance from labeo-nasal junction: greatest *34mm*, least *25mm;* average *30mm*.

Distance of outlet above lower edge of inferior turbinated: greatest *14mm*, least *3mm*; average *10mm*.

It is about *15mm* less in the denuded skull.

In the hardened specimen, the outlet of canal is round or oval, but in fresh sections nearly always slit-like, so fine that it is often difficult to find it by direct examination of a fresh specimen, especially if the mucous membrane is swollen. The canal may also open at the highest point under the inferior turbinated, or, as it frequently does, pass obliquely through the mucous membrane and come out from 1 to *10mm* farther down.

Of the glands extirpated, the largest was from No. 9, length *30mm*, width *13mm*, greatest thickness *8mm*, weight 1.3 *g*. In all cases of removal of gland there was primary union.

CRITICAL REMARKS ON THE RADICAL TREATMENT OF EPIPHORA.[1]

By Dr. A. WIENER, New York.

THAT the treatment of epiphora remains a problem for solution is evident from the ever new remedies offered for its relief. That this should be a difficult problem to solve, is well imaginable, when one considers for a moment the complicated physiological mechanism at play, for the furtherance of the tears from the conjunctiva into the nose. When this is disturbed the etiological factors which are responsible are many and varied. Often the failure to relieve a simple case is due to our negligence and carelessness in not considering some of the minor factors. The duct is surrounded by treacherous neighbors. I refer to the nose and its sinuses, which in the majority of the cases, are the cause of some of our worst types of epiphora. It is an established fact, that more than one third of the cases of ulcus serpens are due to diseases of the sac, indirectly produced by an obstruction of the tear duct. It is our duty, therefore, that this fact alone, outside of the great discomfort occasioned by epiphora, be taken seriously, and every effort made to devise ways and means which will remedy this fault.

When one glances over the descriptions of the various operative measures offered for the relief of epiphora, one becomes bewildered over the array of suggestions offered. As far back as the Ancients, among them, Galen and Celsus, there was prevalent the idea, and even carried out, that a direct communication between the nose and the sac could be practiced

[1] Read at meeting of the Section on Ophthalmology, New York Academy of Medicine, April 21, 1919.

for the relief of epiphora. In later years Langier and Folz suggested that instead of making an opening into the nose to enter the antrum. In 1904 Toti suggested an operation which on account of simplicity appealed to many. Under general anæsthesia he exposed the sac and the lacrimal fossa. From this fossa he resected an oval piece of bone extending from the post-lacrimal crest downwards as far as the lacrimal duct, and upwards as far as the highest point of the sac. He then removed the inner wall of the sac and the nasal mucous membrane corresponding to the opening in the bone. Light tampons were made throughout the wound and nose, and the skin over this sutured. At times a complete resection of the middle turbinated bone or its anterior end was practiced. In spite of the fact that this method offered much, many surgeons still clung to conservative measures. Hess advised permanent sounds; Koster permanent drainage by means of a silk suture moistened with nitrate of silver; Tartuferi a slitting of the upper canaliculus and internal palpebral ligament, curettage of the sac and its treatment with sounds and antiseptic solutions.

The intranasal operation, with sacrifice of tissue and probing, recommended by Polyak, Killian, and Passow, but without much practical experience, did not appeal to many. A great disadvantage was its long-continued after-treatment and control. The placing of foreign substances such as decalcified bone tubes (Guital), after opening the sac and curettage, was not successful. The sac prothesis (Zimmerman method) was condemned both by Kuhnt and Schirmer, as an unsuitable method for replacing the functions of the sac. As these methods proved one after the other disappointing, we drifted to the approved radical cutaneous method of extirpation of the sac, as taught by Kuhnt, Czermak, and Axenfeld. While this offered a cure for the diseased sac, it possessed some disadvantages. The natural passageway for the tears, etc., had been destroyed. The epiphora which remained, while only slightly evident at times, at other times was excessive, and could not be controlled even by removal of the accessory tear gland. Besides these above-mentioned procedures, practiced for the purpose of curing chronic suppuration of the sac, chronic recurring suppuration of the sac, with or without fistula, obstruction or incurable obliteration of the lacrimal

apparatus below the canaliculi, I admit there are many others. It would be vain to attempt an enumeration of them all, in spite of the fact that they may possess more or less merit. I shall confine myself this evening entirely to the recent representative ones.

At present, more than ever, there has been an endeavor to replace the painful probing of the lacrimal passages for epiphora and its complications, either by extirpation of the sac, or the more modern operation dacryorhinocystotomy. It is still claimed by some gentlemen that probing if persisted in will result in a permanent cure. Experience has taught a great many of us, however, that few patients are willing, in spite of the amiable personality and jollying of some of our good friends, to undergo the long-continued and painful discomfort attending such treatment. In nine tenths of the cases, where there is an actual stenosis, such probing is absolutely useless.

Within the past three years my own experience and what I could gain from the experience of others, has led me to believe, that in all the intractable cases, I refer to such where there is an actual stenosis in the duct with its attending complications in the sac, the proper course to pursue is either extirpate the sac or perform the operation of dacryorhinocystotomy. We are all familiar with the classical operation of extirpation of the sac as practiced to-day. When done in a skillful manner, at times, it accomplishes all that is desired under ordinary circumstances. Only too often, however, the operation is unskillfully performed. It is condemned when really the fault lay with the surgeon who neglected to remove the entire sac. While of late I have become an advocate of the operation which I will presently discuss, I still consider extirpation of the sac under certain conditions the preferable operation, viz.: In progressive cases of trachoma with sac complication, in tuberculosis of the sac, in progressive diseases of the nose, and in those cases where it is necessary to give relief in older people and young children, the sac being diseased. Last but not least when a chronic purulent dacryocystitis exists, and a cataract operation is contemplated it is a wise procedure to extirpate the sac beforehand. For the past three years I have been much interested in the operation which establishes an artificial opening into the nose from the tear

sac. This operation is known as dacryorhinocystotomy. At the present time there is a choice between two routes, the external of which the Toti operation is the representative one, and the other the intranasal as practiced by Polyak, West, Mosher, and Yankauer. Of the two routes the intranasal is the more difficult one to perform. It requires especial technical skill limited to those who are skillful in nasal surgery. I can claim from my own experience, that it accomplishes not one bit more than the external operation, if the latter is skillfully performed. The advantage of the Toti operation performed with some refinements in the technic, as suggested by myself, is to my mind an ideal operation. One has at all times a clear view of the operative field. This is most important, as it happens not infrequently that an ethmoidal cell will intervene between the sac and the nasal cavity. When this occurs it is dealt with much more satisfactorily extranasally, than when such a cell is encountered in the intranasal operation. There is no danger of entering the orbital cavity or antrum or intracranial cavity as a possible calamity mentioned by intranasal operators. It is one that I can recommend to all ophthalmologists who are familiar with extirpation of the sac. It can be performed under local or general anæsthesia. This modification of the Toti operation I described in Knapp's ARCHIVES, vol. xlvi., No. 3, 1917, and will not weary you with its complete description this evening.

After performing the operation as described gentle probing is kept up for one month two or three times a week. This is accomplished without the slightest pain and is not to be compared with the probing of the duct. It is necessary to watch the opening within the nose and prevent its closure. The cauterization of the granulations which form around the opening in the nose is all that is necessary. My experience during the past three and a half years with this operation has led me to the following conclusions. I will not burden you with details but will simply state the facts.

Among the cases operated upon were chronic dacryocystitis of the mucopurulent type, ectasia of the sac, and recurrent phlegmonous inflammation, several with fistula, all with demonstrable stenosis at the neck of the sac or below it. In all

the catarrhal symptoms were quickly benefited. The epiphora rapidly disappeared but returned after a longer or shorter interval. This, however, could again be remedied after a short treatment with probes. The majority of the patients seem to be better satisfied with the results from this operation than with any of the other procedures. The only cases in which there had been absolutely no benefit, were those in which there had been extensive slittings of the canaliculi and constant probing. This causes a complete disturbance of the drainage mechanism. Such patients will suffer discomfort of having air and nasal secretion blown back from the nasal passages into the conjunctival sac. In one of my cases where this occurred, the patient went through an attack of acute rhinitis without the slightest evidence of any infection of the sac or conjunctiva. By less vigorous blowing of the nose this fault was held in abeyance. Patients in whom constant probing and extensive slitting of the canaliculi have taken place, will therefore not be the proper cases for selection. The claim made by the opponents of the external operation that the scar made is unsightly and disfiguring is not borne out by facts. I wish most emphatically to contradict this. If the operation is skillfully performed, I claim that the scar after six weeks is scarcely perceptible.

Mosher is correct when he says that the operation of dacryorhinocystotomy like other operations devised to accomplish the same end, faces the danger of a gradual narrowing and final cicatricial closure of the nasal opening. The remedy should be a simple one. It can easily be reopened by slitting intranasally or probing through the canaliculi externally with a minimum amount of discomfort.

Last of all should it prove a complete failure in every respect the sac can always be removed.

Considering carefully the foregoing methods and operations which are practiced for epiphora, instead of practicing dacryorhinocystotomy as a last resort, I would suggest that more surgeons attempt this operation, so that ultimately we might get a better idea of what can be accomplished. We as ophthalmologists see these cases continuously. The ultimate results of an operation like dacryorhinocystotomy may thus be more accurately arrived at. All these cases do well in the beginning.

But what we wish to find out is will they continue to do well. Will it be necessary for them to be kept under continued observation and treatment. My own experience convinces me that the results are satisfactory in so far that the suppuration rapidly disappears, the epiphora is very much diminished, and occasional probing is necessary. The opening in the nose must be watched as it will contract in spite of all that we do. It can easily be enlarged through intranasal manipulation and the patient is again satisfied. The probing which is done occasionally is absolutely painless and is not to be compared with the probing which is done through the duct. Whether the placing of a style will give me still better results I am at present unable to state. There is a possibility that this may eventually be extruded. Even if it does I feel that it can be replaced. I am in full accord with the views expressed by Mosher, when he says that every form of intra-, I will add, extranasal operation is only a temporary success, unless supplemented with probing or the prolonged wearing of a style. The latter when not present carries with it a feeling of helplessness. It goes without saying that the operation which is the simplest and gives the most permanent drainage will be the operation of the future.

I would also like to say that the intranasal manipulations necessary for the external operation can easily be acquired in a short time by most ophthalmologists.

REPORT OF A CASE OF CONJUGATE DEVIATION OF THE EYES WITH ASTEREOGNOSIS.[1]

By Dr. HENRY ALSOP RILEY, New York.

The patient, F. B., Italian, age 33, barber, stated that his present trouble began in December, 1918, with disturbed sensation in the right hand and inability to recognize objects by palpation—no muscular weakness. In March, diplopia appeared due to a drawing of the right eye toward the external canthus of the right eye, followed after a week by drawing of the left eye toward the right. There was some dizziness but no headache. He had a heavy cold in January with some fever.

The past history is not important except that in 1903 the patient fractured the right leg below the knee. The right leg has been somewhat weaker than the left ever since the accident. He has had gonorrhea many times but denies syphilis.

Neurological Examination.—Attitude: head turned to the right in order to bring the eyes to bear on the examiner, Gait: weak and unsteady. Coördination imperfect on both sides. Reflexes: slightly more active on the right side, abdominals were inconstant. The right leg was *2cm.* smaller on the right side than on the left, also true of the right thigh, attributed to the old injury. Sensory examination: diminution of discriminative types of sensation both superficial and deep, affecting particularly the estimation of the distance separating two points and the ability to recognize objects by palpation—slight diminution of pain and temperature; all these changes were confined to the right side. Cranial nerves not affected except for the oculomotor nerves which showed an extreme degree of conjugate deviation to the right, slight nystagmoid movements, and an anisocoria,

[1] Patient presented before the Section on Ophthalmology, New York Academy of Medicine, April 21, 1919.

the left pupil being larger than the right, slightly irregular, central in position. Systemic examination was negative.

Subsequent course showed a slow but steady improvement in the ocular condition until at the present the eyes can be turned as far as the midline. If the gaze be first fixed on the finger and the head be rotated by the free hand of the examiner, the eyes will pass almost into the left canthi. The sensory disturbance has remained unchanged.

Anatomical Consideration of the Oculogyric Pathways.—The oculogyric fibers arise at least in part in a center located at the caudal extremity of the second frontal convolution, pass to the knee of the internal capsule, cephalad to the pyramidal tract compartment, combining with the fibers destined for the nuclei of the other cranial nerves to form a bundle known as the cortico-nuclear fiber bundle. Other centers have been postulated as giving origin to oculogyric impulses in the parietal and occipital regions and it may be that such auxiliary connections may suffice to explain how the patient was able to move the eyes to a greater extent when the gaze was first fixed than by purely voluntary effort. The fibers enter the crus cerebri mesial to the pyramidal tract and begin the process of dispersion to the nuclei of the cranial nerves immediately upon emerging from under cover of the thalamus. The bundles carrying oculogyric impulses leave in three streams, the hypothalamic bundle for the nuclei of the third and fourth cranial nerves, the colliculular bundle, the pes lemniscus superficialis, destined for the nuclei of the third, fourth, and sixth nerve nuclei and the peduncular contingent, the pes lemniscus profundus, destined for the sixth cranial nerve nucleus. As they swing dorsally from their parent tract, these bundles enter the mesial fillet, which lies dorsally and then descending until they reach a point almost directly ventral to their nuclei of destination, they swing sharply dorsally and end about the cells of their nuclei. Connecting the oculomotor nuclei and making possible the conjugated movements of the two eyes is the posterior longitudinal fasciculus in whose dorsal surface are embedded the oculomotor nuclei.

Disturbances in oculomotor innervation may result from lesions located as follows:

1. Cerebral cortex-producing oculo- and cephalogyric disturbance.
2. Internal capsule—affecting all the cortico-nuclear fibers.
3. Hypothalamic region—producing paralysis of vertical gaze.
4. Crural and ponto—crural regions-producing disturbance in lateral gaze.

5. The posterior longitudinal fasciculus—disruption of conjugated movement.

6. The Deitero-oculomotor connection—associated with other equilibratory phenomena and nystagmus.

Lesions may be supranuclear, nuclear, or infranuclear in position:

I. Lesions affecting voluntary motor control.

1. If the lesion is irritative.

(*a*) If the location is supranuclear, the eyes will be drawn away from the side of the lesion.

(*b*) If the lesion is located at the nucleus or below, the eyes will be directed toward the side of the lesion.

2. If the lesion is paralytic.

(*a*) Supranuclear, the eyes will be drawn toward the side of the lesion by the action of the antagonists.

(*b*) Nuclear or intranuclear, the eyes will be directed away from the side of the lesion.

II. Lesions affecting the stabilizing control through an interference with the vestibular oculogyric pathway will produce an involvement of the eye movements on that side with nystagmus.

(*a*) If irritative, deviation will be toward the side of the lesion.

(*b*) If paralytic, the opposite.

III. Lesions affecting the posterior longitudinal fasciculus will disrupt the conjugated movements of the eyes through an interruption between the sixth cranial nerve, the pace maker, and the other oculomotor nuclei.

The character of the sensory disturbance indicates a lesion near the thalamus on account of the profound discriminative disturbance, associated with almost negligible affective disturbance, for it has been shown that the collecting together of fibers conducting similar types of sensation begins as we approach the thalamus, thus separating discriminative and affective types of sensation.

The practical application of these anatomical considerations will supply us with data sufficient to localize our lesion at one point in the cerebrospinal axis. The sensory changes indicate a lesion on the left side of the brain high up in the brain stem. Since the site of the lesion is on the left side and the deviation of the eyes is toward the right, there must be an irritative supranuclear lesion of the oculogyric pathway. The third factor is the dilatation of the left pupil. In the midbrain lies the nucleus of the third cranial nerve with its emergent fibers sweeping ventrally through and around the red nucleus and passing through the mesial extremity of the mesial fillet where are located, at this level, largely the fibers carrying impulses of a discriminative character,

the fibers carrying affective types of sensation being located more laterally. In this part of the fillet can also be found the caudally directed aberrant pyramidal fibers, the pes lemniscus superficialis, destined for the sixth cranial nerve nucleus of the right side. Here at this point of crossing of the three clinical factors of our case can we locate the site of our lesion.

The serological examination was negative in large part, the Wassermann reaction in both blood and spinal fluid was negative. The spinal fluid contained three lymphocytes, the globulin reaction was three plus and the colloidal gold curve was as follows: 1122100000. These findings would indicate an inflammatory or hemorrhagic lesion, non-luetic in character. Such lesions have characterized the post-mortem findings made in cases of epidemic encephalitis and it seems justifiable to make the clinical diagnosis of epidemic encephalitis affecting the midbrain on the left side.

FURTHER REPORT ON FOCAL INFECTIONS OF THE EYE FROM THE INTESTINAL TRACT.[1]

By J. G. DWYER, M.D., Ph.D., New York.

IN making a further report on the above, the original of which appeared last year, we wish to give in more detail the character of the work and the bases upon which we build the hypotheses.

In the first place, we wish to give at length the probable relationship between the intestinal tract, the teeth, and the tonsils as foci of infection in the eye.

Every ophthalmologist is familiar with pathological conditions of the eye, which he feels have their origin in the intestinal tract, due to what is roughly known as auto-intoxication. No further effort has been made in the past to trace out the relationship, and no effort of a specific nature has been made to overcome the focus, as we have done in the infections from the teeth and tonsils, other than general attention to diet and catharsis, and everybody will agree, we think, on our lack of detailed knowledge regarding the action of foods and their exact changes in the body. Hence the question of focal infections from the intestinal tract has been approached in a totally different way, and after four years of investigation, we are ready to indicate certain eye conditions that we think can fairly be attributed to focal infections from the teeth, tonsils, or intestinal tract, and also a method of treatment of the intestinal tract.

In the first place, we wish to refer the reader to the modern conceptions of the method of action of bacteria in the body—

[1] Read before Section on Ophthalmology, New York Academy of Medicine, May 20, 1919.

conceptions totally different from our old ones. This paper is too short to deal with the question in any detail, but suffice it to say that we have in the intestinal tract, an ideal source for the production of toxins, or toxic products, their absorption and localization in the point of selection. One very important point to be emphasized and remembered is the fact, that focal infections generally occur only in those parts of the body where we have a change in the blood or lymphatic supply. By this we mean that the parts of the body where the nutritive supply changes rather suddenly from blood to lymph are usually attacked, and in the eye, the part attacked is usually the choroidal coat, etc., where we have a similar change in the vascular supply. It is noteworthy that we hardly ever have infections of this type in the bodies of organs or muscles, etc.

Another very important point is the fact that pressure is of great importance in the production of such infections. An apical abscess of a tooth with pus under pressure is usually of more importance than extensive pyorrhea, and a hard fibrous tonsil with pus under pressure follows the same law. The same general rule applies to the intestinal tract.

Now with regard to the intestinal contents, the main points to be noted here are: (1) the reaction; (2) the food detritus; (3) the relative number of putrefactive bacteria to the colon bacillus.

(1) The reaction—This is a very important point, and one that cannot be emphasized too much. The big majority of feces are excessively acid, and we believe this excess of acidity is of great importance. A certain type is excessively alkaline. This excess of acidity and alkalinity will usually be found to be due to the action of putrefactive bacteria, and one of the main factors in the treatment is to overcome this excess acidity or excess alkalinity as the case may be by the measures outlined under methods of treatment.

By changing the environment in which such putrefactive organisms live and thrive, and making the environment unsuitable we can usually kill off readily the putrefactive bacteria. This reaction is readily altered from excessive acidity by the use of sodium carbonate in solutions as high as 4% but usually for routine purposes we use 1% solutions. Formerly we tried to overcome excess alkalinity by the use of vinegar,

but now we try to overcome the bacteria producing this condition, by the use of an excess of alkali, which is non-irritating.

(2) The food detritus—No change has been initiated here and as indicated in our former paper, we aim to establish the diet in such a way that, those types of food which are not assimilated or which are highly protein in nature are cut down. Again, if the carbohydrates are not fully assimilated they also are cut down to the point of tolerance, etc. The amounts of indol and skatol, classed as toxic elements, have been used as the index to measure the degree of toxicity of stools. This method has its disadvantages, but for want of better index we had to use this. These elements are normally present in varying amounts, and it is only when they are present in excess, that they serve as an index probably of too much toxic material.

(3) One of the main points in the work is the examination as to the relative amounts of the colon bacillus compared with the putrefactive organisms. As is well known it has always been a mooted question as to the function of the colon bacillus in the intestinal tract. There are many divided opinions. One school of investigators claim that the colon bacillus is present simply as a saprophyte, performing no function at all; the other school claims that it is an important factor in the digestion of proteins, carrying the digestion of proteins to a further point usually than the indol stage. We accept the latter view, which is quite generally accepted now, and have gone on the plan that after clearing the intestinal contents of the putrefactive bacteria by the sodium carbonate treatment, we increase the amount of colon bacilli by planting in the intestinal tract living culture of a good active strain of colon bacillus.

This, in simple terms, is the basis of the work and the typed forms for the analysis are here appended. The directions for treatment as outlined are also appended. It is very essential that the feces should be obtained as fresh as possible, as the reaction changes very quickly, if allowed to stand, and also the amount of the toxic elements.

The series of eye cases now completed is 122, of which we have complete records. In the beginning we wish to state that a very exhaustive examination of each patient was made,

so as to eliminate as far as possible any other cause. The big majority of these cases comprised lesions of the iris and ciliary body—such diseases as iritis, iridocyclitis, cyclitis, "rheumatism" of the eye; keratitis of special forms; retinitis, choroiditis, etc., of the types usually associated with metabolism; optic neuritis of the same type and œdema of the optic nerve; sympathetic ophthalmia.

In analyzing such a series, it is very hard to arrive at a definite conclusion that can be set down on paper, unless we go into a whole recital of separate cases. Our experience goes to show, however, that in this treatment, we have a means of clearing up comparatively quickly such focal infections as are outlined above; that it is a definite advance upon the treatment formerly instituted in such cases, and that it is worthy of an extensive trial by ophthalmologists in such cases. The treatment has in the last two years been applied to kindred focal infections in other parts of the body, and the results are just as striking there. A considerable group of men are now working along different lines and their reports will be published in the near future.

The methods of treatment were originated in large part by Mr. J. J. Connellan, and the fecal examination carried on by him. The clinical investigation was carried on by us. This paper constitutes a report on this phase of the question.

For the last twenty years, it has been the endeavor of various bacteriologists to influence in various ways the contents of the intestinal tract. Reference to the work of such men as Metchnikoff and Escherich show how they worked along these lines. We believe that in the above outlined method, we have a means of definitely changing the condition of the large intestine, and that many pathological conditions having their origin in the intestinal canal are now amenable to direct treatment, compared with the former indirect methods, through the use of cathartics, and the indefinite variations in diet.

DIRECTIONS FOR THE TREATMENT OF HIGHLY ACID STOOLS.

Strict adherence to the diet list. Commence treatment with a small dose of castor-oil or citrate of magnesia one half-

hour before breakfast; no further purges. Irrigation of colon: two quarts of warm water, temperature 108° Fahr., containing a teaspoonful of sodium carbonate, to each quart, each night before retiring for three nights. The bag containing the solution should not be elevated over eighteen inches above rectum. Do not use high rectal tube. The small tube about four inches long, generally sold with fountain syringes, answers the purpose. The warmth of solution and slowness of injection permit reverse peristalsis. At the end of the irrigation treatment, three to four tablespoonfuls of sugar of milk is added to the diet for each meal. The live cultures of colon bacilli of approximately six ounces at room temperature are now injected into the colon once every three days, until we have an almost pure culture of colon bacilli in the fecal examination. These cultures are injected extremely slow, either by catheter or rectal tube. Half an hour to one hour previous to plantation of colon bacilli, three to four ounces of a strong solution of common sugar are injected into the colon, the object being to furnish a growing media for the bacilli.

Feces Examination

Color
Brown
Appearance
Odor
Reaction
Concretions
Bile Pigment — Tests for Hydrobilirubin
Amylopsin
Trypsin

Toxic Elements
- Indol Plus
- Skatol Plus

Microscopical Examination

Food Residue
- Fibers
- Starch
- Fats
- Other Forms

Pus
Blood — Tests for Blood Pigment
Epithelium
Crystals
Mucus
Ova
Parasites
Bacteria

TREATMENT OF INTESTINAL INFECTIONS.[1]

By J. J. CONNELLAN, New York.

WHEN calling this method of treatment to Dr. Dwyer's and Dr. McCreery's attention, I had in mind the results of about two hundred odd examinations of fecal matter done for Dr. A. V. Wendel of Newark, during the winter of 1915 and 1916. Dr. Wendel used in his treatment different solutions based upon chlorinated soda with varied success. In Dr. McCreery's case of anæmia, which was about the first one started on carbonate of soda method, the treatment was only suggested after many agents had been tried in their germicidal action with fecal matter, followed by incubation for varying periods and afterwards plating on culture media. The following is a brief outline of the treatment.

The object of the treatment herein described is to rid the large intestine, as far as possible, of the toxin producing organisms present and to replace them with non-toxin producing organisms as the B. coli, which is accepted as being the predominating organism in the large intestines under normal circumstances. This we endeavor to accomplish by introducing into the colon a solution unfavorable to the growth of the abnormal organisms. In the early stages of our work, we found that we had to deal with two types of pathological stools, one of which is characterized by a soft mushy gaseous mass which invariably gave a high acid reaction to phenolphthalein titration, and the other a solid, well-formed stool, such as that found in constipated patients, and which was found to give an alkaline reaction to phenolphthalein. Therefore, we pro-

[1] Read before Section on Ophthalmology, New York Academy of Medicine, May 19, 1919.

ceeded with the idea that high acid producing bacteria would not thrive in an alkaline environment and vice versa. Hence, we tried a number of different solutions, such as a weak solution of peroxide of hydrogen, lactic acid, acetic acid, chlorine and quinine solution, etc. However, we found that one half to three fourths per cent. solution anhydrous carbonate of soda when added to a fresh fecal specimen, and this specimen incubated for one hour, gave negative culture plates after incubation for twenty-four hours, except in the alkaline specimens. Especially was this true in the cases of stools giving a high acid reaction. We further found that the reaction of the stool is controlled completely by the type of organisms present, and has no relationship with the gastric contents. We therefore accepted the carbonate of soda solution as being one which would give us the effect desired, without causing any undue symptoms or distress to the patient. It is, in addition to being germicidal, very cleansing and non-irritating.

The treatment is begun by giving the patient an effective purge fifteen to twenty minutes before breakfast on the day the first cleansing enema is to be given. This purge preferably should be one which produces evacuation by causing increased peristalsis as the result of an irritation, rather than a saline action, for we have found that saline cathartics will alter the character of the reactions.

For these reasons we prefer the administration of castor oil or citrate of magnesia. We suggest the administration of the purge fifteen or twenty minutes before breakfast, as we have observed that a purge given at this time and followed by a slight amount of exercise, produces a rather rapid and complete evacuation of the colon without causing the patient any discomfort from the griping so often complained of by some patients following the taking of a purgative drug. By means of this cathartic, we believe that we are able to almost completely empty the transverse and descending colon, and to empty partially the ascending colon and cæcum. In this way we endeavor to obtain as full a germicidal effect as possible from the initial enema given, by having the colon reasonably free from feces, in order that the patient may receive and retain more readily the two quarts of solution given at each cleansing treatment.

In giving this treatment, we have found that the best results have been obtained by placing the patient in a left Simms position, and adhering to what we have termed a low enema. While we believe that a high enema is more cleansing, when given for that purpose and not with the idea of having the solution retained, we do believe that the manipulations necessary in giving a high enema are too irritating and militate against the objects which we desire to obtain: that is, retention of the carbonate solution, and the absence of irritation, and the production of reverse peristalsis.

Therefore, we have found it most convenient to use the ordinary soft rubber French Catheter No. 16 fixed to the hard rubber attachment of the ordinary douche bag or can. The catheter should be well oiled and introduced five or six inches in the rectum.

In order to produce reverse peristalsis, we believe that the solution used should be warm, at least 108 degrees Fahr., and given very slowly, beginning in the manner of a Murphy Drip and gradually increasing the flow, so that the time required for the introduction of the whole two quarts of solution should consume thirty-five to forty-five minutes. This way, we hope to fully reach every part of the large intestine and distend the mucous membrane enough for the solution to exert its effect upon the whole mucous membrane of the colon, including that part entering into the formation of the rugi of the colon.

The initial enema should not be given for at least two hours after the last evacuation caused by the cathartic, and as it is rather difficult to estimate this time, we believe that it is a safe procedure to place the limit of time for giving the initial enema at twelve hours after the administration of the cathartic. It is preferable that the enema be given at night before retiring, because at this time the patient will ordinarily be less active and more likely to retain the solution for a longer period of time. We have found that in some cases it has been possible for the solution to be retained overnight. Again the enema should not be given within three hours after a meal, in other words, until long after active peristalsis has subsided following the meal, and at least two hours before a meal, so that the peristalsis produced by food intake will not stimulate a bowel evacuation.

The number of cleansing enemas to be given will depend upon the character of the return flow. That is, the cleansing enemas are to be continued until the return flow is such that it is free from mucus and any offensive odor, and the bacterial sediment in small amount. This will usually require anywhere from five to ten enemas, depending upon the character of the case treated and the experience gained by the treatment of a large number of cases. We have found that it is better to give the second or any succeeding enemas within a twelve-hour period, when it may become necessary, than to allow the patient to go thirty-six hours. For we believe that in the event of waiting thirty-six hours the effect of the soda solution is at a minimum and we are likely to have the production of new crops of bacteria, which might have been eliminated if the enema was given within a twelve-hour period.

The amount of soda given in the solution varies with the character of the case to be treated. In those having a high acid stool, we dissolve two teaspoonsful of anhydrous carbonate of soda to each quart of water used. However, in very high acid stools and alkaline stools, and in those cases complicated by diabetes, we have added four teaspoonsful to each quart of water used. This amount of soda is given in alkaline cases to produce a germicidal effect by over-alkalinization, and in the diabetic cases for the beneficial results which may accrue from the absorption of the soda, and in the very high acid cases for a more pronounced and speedy effect. We have not experienced any bad results from the administration of the soda in the amount mentioned, even after a strong solution has been retained over a long period. We would also advise that in acute toxic cases, such as cases of ptomaine poisoning following ingestion of some product likely to produce such a condition, two or three enemas should be given at twelve-hour intervals at the beginning of the treatment.

We have used as an index in determining whether or not our solution is reaching the cæcum and the amount of absorption of alkali taking place, the examination of the urine as to its alkalinity.

The day following the one on which we have decided that the colon is sufficiently clean and devoid of bacteria likely to inhibit the growth of the B. coli is the day on which we begin

to plant live B. coli (B. coli Communis). The number of plants used and the method giving the best results is that suggested by Dr. E. Libman, and is as follows: One plant every day for three days, one every other day for three times, and one every third day for four times. The planting of the B. coli is preceded by a small enema of four ounces of water containing a teaspoonful of milk sugar. This solution should be given very warm fifteen or twenty minutes before the colon plant and allowed to flow into the rectum very slowly. The idea in giving this solution very warm and allowing it to flow very slowly, is to create reverse peristalsis and furnish a suitable pabulum for the B. coli. It is very essential that the same rule relative to time of enemas be applied to planting of the cultures.

We have found that in some cases the administration of the sugar of milk solution is followed by the formation of considerable gas. However, in those cases in which we have had to deal with this condition, we have found that it is very satisfactory to use ordinary cane sugar in the same proportion as milk sugar, for it is a known fact that the B. coli is a non-gas producer with cane sugar.

The B. coli should consist of the washing of two plates with 5% cane sugar solution with sufficient normal saline solution added to bring the amount up to four ounces. It may be necessary to use three plates when the growth is not abundant. We usually added enough of B. coli to four ounces of saline to produce an opaque whitish appearance when held up to the sunlight. This solution is given very slowly after the manner of giving the milk sugar, and fifteen or twenty minutes should be consumed in allowing it to enter the rectum; both solutions when properly administered should reach the cæcum. Both sugar of milk solution and colon plant are given with the intention of having them retained, and it is therefore advisable to keep the patient quiet for a reasonable amount of time after these solutions have been administered.

We have found that B. coli cultures should be used within five hours after washing from plates.

Following Dr. Dwyer's different papers in bringing the method to the attention of the profession, others are conducting investigations in many fields other than the eye. It

is now being tried out in heart and kidney cases, blood pressure, different types of skin lesions, orthopedic cases, glycosuria, and diabetic anæmias, and cases that come under the sphere of the neurologist. I feel that I have no right to discuss at the present time results obtained by these men, knowing that their conclusions will be reported shortly.

THE AUTOTOXIC FACTOR IN SYMPATHETIC OPHTHALMIA.[1]

By Dr. ARNOLD KNAPP, New York.

AN attempt to unravel the mysteries of sympathetic ophthalmia has been made by Elschnig following an idea of Bail by regarding it as an anaphylactic phenomenon. To explain the onset of inflammation in the healthy eye, he has assumed an additional factor in a general disease or autointoxication, and claims that since following out measures directed to relieving this toxic state, no cases of sympathetic ophthalmia have been observed at his clinic. While the anaphylactic theory, though offering many suggestive lines of thought, has been criticized by some especially on clinical grounds and corroborated by others, as in the excellent research work of Alan Woods, the solution of this problem is still far distant in the future, on account of the many difficulties which belong to a most intricate chapter in serology and immunology. It is therefore needless for me to enter into a discussion of these questions on the basis of clinical observation, yet I venture to believe that the publication of four cases concerning the autotoxic factor in sympathetic ophthalmia may be of interest.

Attention has previously been drawn to general disturbance of health in sympathetic ophthalmia, and some have claimed that the constitution of the patient must be regarded. According to Schmidt-Rimpler's theory, in which Panas is of accord, sympathetic ophthalmia can only attack an already sick individual. Elschnig assumes the presence of a somatic

[1] Read at the meeting, American Medical Association, Section on Ophthalmology, Atlantic City, June 10, 1919.

anomaly consisting in a constitutional disturbance, nephritis or diabetes, or in auto-intoxication. De Schweinitz, in opening the discussion on the Anaphylactic Basis of Sympathetic Ophthalmia before this Section in 1917, spoke of the late Dr. Hubbell of Buffalo as having in 1900 advocated the relation of auto-intoxication to sympathetic ophthalmia.

Clinically it has been customary to divide sympathetic ophthalmia into serous and plastic, the latter of much more grave prognosis, while the former yields generally to treatment. Schirmer (*Graefe-Saemisch Handbuch*) speaks of these two forms as grades of the same process; the more fibrinous and the more exudative, the severer the inflammation, and believes that Mauthner is distinctly in error in separating serous iritis from plastic iridocyclitis in sympathetic ophthalmia as being two different processes. In the serous cases, which the French writers call attenuated sympathetic ophthalmia, the pupil dilates under treatment and remains dilated, there are no flat adhesions of the iris to the lens, no papular elevations in the iris tissue and peripheric retraction of the iris does not take place.

In these mild cases interesting fundus changes have been described. Haab (*Heidelberger Congress, 1897*, p. 165) in an article on "Chorioretinitis sympathetica" drew attention to bright disseminated choroidal foci in the periphery of the fundus in conjunction with symptoms of serous cyclitis. These spots are small, round, without marginal pigmentation, often lying under a retinal vessel. There is usually a neuroretinitis. Quite characteristic macular changes develop at a later stage, consisting in a brown spotted base with anastomoses of fine red lines. The macular changes are permanent, though curiously enough they do not affect vision appreciably. The choroidal spots appear from one to five months after the onset of sympathetic ophthalmia and increase gradually in number, and then remain stationary, though Eversbusch has observed their disappearance. The macular changes appear at even a later date.

Prognosis in these serous cases is relatively good, though exceptionally the disease may at any moment go over into the fibrinous form. The serous cases, furthermore, may occur at an unusually late onset, the inflammation in the first eye is not

necessarily typical, nor severe, and enucleation does not change the course of the disease.

During the past year I have had the opportunity of observing the four following cases of sympathetic ophthalmia of the type of serous cyclitis which suggested a toxic manifestation.

CASE 1.—*H. S.*, aged 9½, was seen Dec. 12, 1917, stating that eight weeks before the right eye was injured by being struck with a stone; it was then operated upon and treated. At present the eye is soft, with a depressed scar over the ciliary region down and out, cataract and faulty projection. The left eye sees $\frac{20}{40}$, there are a number of posterior corneal deposits and a few pigment spots on the lens. The eye is white, the interior shows a mild neuroretinitis. In view of the symptoms of a beginning cyclitis in the second eye, the right eye is immediately enucleated. General treatment, consisting of thorough catharsis, attention to diet, subconjunctival injections and atropin are instituted. The deposits in the left eye cleared up and patient was discharged on January 10th. One month later some additional deposits were seen. Treatment was again instituted in the hospital, and after one month the condition had again cleared up and the eye has remained normal.

Microscopic Examination.—There is a gap at the sclerocorneal junction which is filled with loose connective tissue containing dilated vessels and collections of lymphocytes. The root of the iris is transformed into a very vascular and cellular tissue. The cells at this place are lymphocytes, epithelioid cells and giant cells; the last especially in the neighborhood of several foreign bodies. This infiltration continues into the swollen ciliary body and processes and diminishes in intensity in the congested choroid. There is an organized exudate extending from the site of the penetrating injury along the anterior and especially the posterior surfaces of the lens where a beginning detached retina is adherent. The optic nerve shows a moderate neuritis with œdema, swelling and proliferation of septal cells.

CASE 2.—*E. D.*, aged 37, a baker by trade, was seen May 16, 1918, stating that four weeks ago the right eye was injured by the penetration of a piece of steel. This was extracted with a giant magnet, but the eye has never entirely recovered, and for the past four days there has been an increase in the inflammation. Patient is fat and flabby, has always been an excessive sugar eater and has suffered from constipation. To-day marked ciliary congestion, a central wound of the cornea and lens capsule, hypopyon.

Vision $\frac{1}{200}$. Admitted to the hospital and treated with leeches, atropin, salicylates, subconjunctival cyanide injections and pilocarpin sweats. Two weeks later the iridocyclitis remained intense and had not in any way responded to treatment. Complained of slight discomfort in the left eye and on examination there was slight ciliary congestion, posterior corneal deposits, and neuroretinitis. S. = $\frac{1}{8}$. The right eye was then enucleated. While under ether a deep cyanide injection was made in the left orbit. He was put on a daily pilocarpin sweat and mercurial inunctions. The pupil responded to atropin; there remained ciliary congestion, many corneal deposits, neuroretinitis.

June 19th.—S. = $\frac{1}{8}$. The eye was slightly better. Examination by the dentist revealed two defective teeth in the upper jaw; these were extracted, without subsequently exerting any particular influence on the eye condition. The patient was very prone to atropin eczema and was put on a sugar-free diet and given dilute nitric acid before meals.

July 1st.—S. $\frac{1}{8}$, slight ciliary congestion, corneal deposits as before. Vitreous slightly cloudy, optic nerve blurred. In the periphery of the eye ground there were many characteristic round choroidal atrophies as described by Haab.

July 23d.—There had been a gradual improvement. Some of the choroidal foci had disappeared and in the macula lutea there was a beginning formation of irregular pigmentation. Vision $\frac{1}{8}$.

July 30th.—Gradual improvement; a few corneal deposits, fundus clearer, pigmentary changes in the macula more marked.

August 7th.—S. $\frac{1}{8}$. The eye has had a slight relapse. This promptly subsided on a thorough evacuation of the bowels. August 14th. $\frac{1}{8}$. Pupil free and reacts. There are about fifteen small posterior deposits. September 20, 1918, vision normal. A few corneal deposits remain. Pigmentary changes in the macula without in any way affecting his vision.

Microscopic Examination.—There is a cellular infiltration in the swollen subconjunctival tissue at the limbus which extends back. In the scar of the periphery of the cornea a knuckle of iris is caught. The posterior surface of the cornea is lined with inflammatory products which are also present on the anterior surface of the iris. The iris and ciliary body are in an active stage of inflammation, the leucocytes being particularly abundant in the pars ciliaris retinæ and the adjoining parts of the vitreous. From there backward the character of the inflammation changes and a typical infiltration of the choroid with lymphocytes can be observed. This infiltration increases and in the posterior

part of the eyeball completely fills the choroid. The optic nerve is swollen and inflamed.

CASE 3.—*S. B.*, aged 20, a well-nourished young man, was seen September 25, 1918, referred by Dr. Darling of New Rochelle. The right eye was injured November, 1917, by a nail. The eye was at first treated, but an enucleation became necessary on December 6th. The left eye became involved three days later with ciliary congestion and corneal deposits, and vision was very much reduced. The eye improved, but there have been many recurring attacks of severe inflammation and diminution of sight. The last one of these was September 10, 1918, and was very severe. To-day the eye is white, pupil dilated, posterior synechia, many posterior corneal deposits distinctly brownish in color. Iris markings fair, tension normal, vitreous clear. Vision $\frac{20}{40}$. Patient was seen by Dr. W. E. Deeks, of New York, who regarded him as a case of sugar intolerance.

An *examination of the stool* by Dr. J. G. Dwyer of New York, showed a very toxic stool, highly acid reaction, indol, 4 +, skatol 3 +, bacteria all Gram positive. The urine contained a trace of albumin and casts. He was put on a restricted sugar-free diet and given dilute nitric acid before meals and high colon irrigations. He was subjected to the usual treatment by sweats and subconjunctival salt injections. Gradual improvement until Nov. 8th, slight relapse, the eye becoming red for two days, with an increase in the corneal deposits.

Nov. 26th, another relapse with ciliary congestion and a narrowed pupil.

Dec. 6th, another examination was made by Dr. Dwyer of the stool, which was then found improved and only slightly acid.

Dec. 18th, after a stay in the hospital of ten weeks, vision $\frac{20}{80}$-, vitreous clear, retina hazy, choroidal atrophies and a central chorioretinitis. The treatment with the diet was continued, and he was advised to take castor oil once a week. A slight attack on Dec. 25th, which lasted two days. The recent attacks have been distinctly getting very much milder.

March 4th, has had no further attacks. Vision to-day is $\frac{20}{80}$. The lower half of the cornea still presents many brownish but small deposits, tension normal, faint opacities of the vitreous; the fundus changes are quiescent, some macular pigmentation and in the periphery of the eye ground, small choroidal atrophic spots.

It was impossible to obtain the enucleated eye for microscopic examination as the oculist who removed it is at present in France.

CASE 4.—*J. F. L.*, aged 48, a pale, fat man, was seen October 12, 1918. Has had symptoms of glaucoma in the left eye for which in August he had had an iridectomy performed by his oculist. One month later the eye became inflamed and has remained in this condition up to now. Today R. $\frac{20}{30}$, L. $\frac{20}{200}$. There is an irregular scar in the upper part of the left cornea from the iridectomy incision in which iris is caught. Ciliary congestion and posterior corneal deposits. Tension: R. 25, L. 32. He is admitted to the hospital for treatment. Pilocarpin sweats, mercury by mouth, and cyanide subconjunctival injections are given.

Oct. 23d.—The right eye had developed a ciliary congestion and posterior synechia. R. $\frac{20}{70}$, L. $\frac{12}{200}$.

Oct. 25th.—The right eye had responded to treatment and an operation was performed on the left eye in order to free the adherent iris. This was done, causing very little additional traumatism to the eye, but was followed by a recurrence of the cyclitis with exudation in the coloboma.

Oct. 28th.—The right pupil was dilated, tension normal.

Nov. 4th.—The right eye again showed ciliary congestion, with posterior deposits, hazy vitreous and neuroretinitis. S. $\frac{20}{200}$. The left eye was moderately inflamed and the lens showed a beginning cataract. He was now subjected to a thorough general examination which gave a negative Wassermann, streptococcus fixation test negative, urine normal. There was a posterior ethmoiditis on the right side and a probable affection of the gall bladder. He was put on a sugar-free diet with daily sweats, a mercury pill, and colon irrigations.

Nov. 13th.—The gall bladder was found tender on palpation. R. $\frac{1}{200}$. Field for hand apparently normal.

Nov. 22d.—R. $\frac{3}{200}$. Vitreous very dull, apparently an exudate about the optic nerve. Left tension normal.

Dec. 6th.—R. $\frac{1}{200}$, many corneal deposits with deposits on the lens capsule, vitreous cloudy, fundus dull.

Examination of the stool by Dr. Dwyer revealed very toxic acid stool with exclusively Gram positive bacteria, indol 5 +, skatol 3 +.

The sweats were then stopped, colon irrigations and a restricted diet begun.

Dec. 18th.—Somewhat better. S. $\frac{8}{200}$, eye ground clearer. A mixed vaccine was given and B. B. culture.

Jan. 6th.—R. $\frac{13}{200}$, gradual improvement. Blood analysis showed NPN 41, Urea N 17.3, Creatinin 1.10, Uric ac-3.7, Sugar .11.

Jan. 21st.—Many posterior corneal deposits, the interior much clearer, pupil dilated. Left cataract had advanced, perception of light good, the eye quite free from inflamma-

tion, and tension normal. A number of affected teeth were removed.

Feb. 6th.—R. $\frac{1}{\infty}$. Left eye showed secondary glaucoma.

Feb. 13th.—Relapse in the right eye apparently following a fresh head cold. S. $\frac{20}{100}$, fundus hazy.

March 10th.—Re-admitted to the hospital. The cataract in the left eye was extracted to relieve the secondary glaucoma. After this operation an attack of glaucoma developed in the right eye, but gave way to drops.

March 13th.—The right ethmoid cells were cleaned out and this was again followed by an attack of increased tension in the right eye.

April 1st.—The right eye was quiet; pupil semi-dilated, some deposits on the lens capsule at pupillary margin. Posterior corneal deposits. S. $\frac{2}{6}$. Fundus showed peripheric choroidal and macular changes. T. 30. The left eye: secondary cataract, eye white. Projection and tension normal.

Remarks.—In these cases an injury or an operation causing iridocyclitis in one eye was followed by serous iridocyclitis in the second eye. In the first case the symptoms were mild and yielded readily to treatment. In the other three the ocular symptoms were those typical of serous cyclitis, namely, moderate ciliary congestion, dilated pupil, posterior corneal deposits, vitreous opacities associated with fundus changes which have been described under the name of chorioretinitis, sympathica, neuroretinitis, and macular changes. The characteristic small choroidal spots appeared without any pigmentation in the periphery of the eye ground after the process had existed for about six weeks and some of them later disappeared without leaving any trace. In the two more severe cases there were larger irregular chorioretinal foci. Neuroretinitis was present in all. The macular changes consisted in irregular choroidal pigmentation, appearing late in the course of the disease and apparently not affecting vision.

The *anatomic examination* could only be made in two of the three cases where an enucleation was done. The changes in the eye of Case 1 consisted in mononuclear lymphocytic infiltration of the uvea, particularly of the iris and ciliary body, and slight optic neuritis. In Case 2 the evidences of a purulent inflammation preponderated in the iris and ciliary body but the typical sympathetic infiltration was pronounced

in the choroid, especially in its posterior half about the inflamed optic nerve. The enucleated eye from Case 3 could not be obtained for examination. In Case 4 the injured eye is now white; there is a secondary cataract, posterior synechia, light projection and tension are normal.

The *autotoxic factor* depended on the following: There was generally a history of improper diet and overeating, often associated with constipation. The examination of the stools was made by Dr. Dwyer in two of the cases and gave a highly toxic acid stool, large excess of skatol and indol and exclusively Gram + bacteria. Treatment which was the usual one practiced in sympathetic ophthalmia, namely, mercurial inunctions, sodium salicylate, pilocarpin sweats, did not seem to have very much effect. It should be also mentioned that the elimination of associated infections, abscessed teeth, and nasal sinus empyema, did not exert any influence of the course of the disease. Regulation of the diet, thorough catharsis and colon irrigations seemed to be our most effective agents.

Objection has been raised against Elschnig's hypothesis of an autotoxic state in sympathetic ophthalmia, at least the demonstration of the symptoms and changes in autotoxemia have been vehemently attacked and dismissed as inadequate.

Treatment in sympathetic ophthalmia usually consists in mercury by inunctions, which is the remedy favored by the German writers, and large doses of sodium salicylate, by which H. Gifford has obtained such brilliant results. It is true that the cases of serous sympathetic iridocyclitis, the attenuated form, usually get well, and it is hard to say how much any treatment helps. At any event, we do not know in what way either mercury or sodium salicylate acts.

I realize the temerity of advocating autotoxemia at the present day, and I am fully conscious of the many imperfections in the presentation of these four cases from an autotoxic standpoint; yet I feel the importance of investigating for a toxic factor in sympathetic ophthalmia, and if found present its elimination in a prophylactic endeavor, as Elschnig suggests, cannot be passed by.

REPORT OF TWO UNUSUAL COMPLICATIONS OF HERPES ZOSTER OPHTHALMICUS: (*a*) ACUTE RETROBULBAR NEURITIS (NEURITIS AXIALIS); (*b*) ACUTE GLAUCOMA.[1]

By CLARENCE A. VEASEY, M.D., Spokane, Wash.

OCULAR complications of herpes zoster ophthalmicus are by no means rare. It is believed by most authorities that they are most frequently observed when the nasal branch is involved. The conditions usually noted are keratitis, anterior uveitis, and at times a more or less extensive iridocyclitis. The notes of the following two cases show some points of unusual interest:

Case 1.—*Acute retrobulbar neuritis (neuritis axialis) complicating an attack of herpes zoster ophthalmicus.* Mrs. J. K. M., aged about forty, married, was first seen by me December 8, 1911, on the third day of an attack of herpes zoster ophthalmicus on the right side for which she was being treated by the family physician. The right eye was somewhat congested and lacrimation was quite free, but there was no ulcer and no visible ophthalmoscopic change. Four days later, or on the seventh day of the attack of herpes, the patient first observed that vision in the right eye was almost entirely abolished, there remaining only a small portion of the upper field. She was an exceedingly intelligent woman and stated that when the vision first began to disappear she observed a dark area directly in the center of the field which gradually became larger and larger until at the time I saw her on the date mentioned there remained only a very small area in the upper portion of the field. No ophthalmoscopic change in the nerve or fundus

[1] Read at the fifty-fifth annual meeting of the American Ophthalmological Society at Atlantic City, N. J., June 14–17, 1919.

could be detected. The following day vision was entirely abolished, not even light perception being present. The pupil was small and still no visible ophthalmoscopic change could be observed. There was no corneal involvement at any time and no involvement of the nasal branch of the nerve existed during the attack of herpes.

The urine revealed a small amount of albumin. The blood showed normal hæmoglobin and the white corpuscles to be but slightly increased. An examination of the nasal accessory sinuses proved negative.

On January 2d of the following year, nearly four weeks from the beginning of the herpes and more than three weeks from the beginning of the neuritis, central vision was still abolished by a large central scotoma, the vision of the peripheral field having improved. A week later the patient could count fingers with this eye at two feet. The optic nerve was now quite pale and distinctly atrophic.

In spite of mercurial inunctions, the iodides, pilocarpin sweats, and subsequent daily strychnia injections into the temple, not only could no further vision be restored but the small amount present became entirely abolished, the eye remaining totally blind, the optic nerve being completely atrophied.

A few weeks later the patient developed an appendicitis and was successfully operated upon. She had always been rheumatic and had had several severe attacks for which she had taken hot baths and mud baths at one of our local resorts. She had also been subject to supra- and infraorbital neuralgia. The attack of herpes zoster ophthalmicus, however, was the first she had ever had, the acute retrobulbar neuritis appearing a few days after the beginning of the attack and passing rapidly to total blindness with complete optic nerve atrophy.

So far as I have been able to ascertain in the search of the literature, the case is unique, as I can find no mention of acute retrobulbar neuritis complicating a case of herpes zoster ophthalmicus.

Acute retrobulbar neuritis has been reported as of septic origin and due to focal infections. Lambert and Hansell, at the meeting of the American Ophthalmological Society in 1918, reported such cases, and in the discussion of their papers, Shumway, Shoemaker of St. Louis, Weeks, Sutphen, and Carpenter referred to additional cases. The above case was observed before we were studying focal infections. It has been shown recently by someone, I believe, that

herpes zoster may arise from a focal infection. Whether this was true in the above case and the acute retrobulbar neuritis, as well as the herpes zoster, was due to a focal infection, or whether the neuritis was simply a complication due primarily to the herpes, of course it would be impossible to state.

CASE 2.—*Acute glaucoma complicating an attack of herpes zoster ophthalmicus.* On November 5, 1918, A. B., an unmarried male, aged about thirty, presented himself for diagnosis of the condition of his right eye. The following history was obtained: Three weeks before there had been observed first a number of blisters on the right forehead and on the right temple and side of nose. There was also marked swelling of eyelids. Since then the vision of the eye had been poor.

The vision of O. D. was $\frac{1}{\infty}$, of O. S. $\frac{6}{6}$. The cornea of O. D. was peppered with minute areas of superficial infiltration, as if there might have been broken down herpetic blisters. The whole cornea was in addition quite hazy; the anterior chamber was apparently of normal depth and the pupil widely dilated and immobile. There was marked pericorneal injection. No fundus examination was possible on account of the haziness and peppered condition of the cornea. The tension by the Schiotz tonometer was 35*mm.*

The patient was a Christian Scientist and had been under the care of a Christian Science reader since the beginning of the attack. He stated that he had no pain, but his facial expression and his worn-out appearance showed that he had suffered severe pain, although, I understand, Christian Scientists do not admit that pain exists.

The typical spots of herpes zoster ophthalmicus in the stage of clearing up were observed. The nasal branch was affected as well as the supraorbital. The patient could give no idea as to the length of time the glaucoma had been present.

He was given a solution of pilocarpin for instillation into the eye, together with a purge and hot compresses, and within three days the tension had become normal. But the vision was still reduced as before, probably because of the corneal condition and the length of time that the tension had been elevated. The patient, during the few days of his appearance at the office, was always under the care of a Christian Science reader, and after these few days' observation disappeared and has not been seen since, so it is not known just what the ultimate outcome was.

This case seems to be one of acute glaucoma complicating the attack of herpes zoster ophthalmicus. Such a condition is comparatively rare. Weeks at the meeting of the American Ophthalmological Society in 1917 reported three cases and reviewed the literature.

As to the etiology, it has been shown that the aqueous humor is changed in all cases of inflammation of the uveal tract. In some there has been found an increase in albumin, and in the aqueous of glaucoma there has been shown to exist both organic and inorganic matter. Weeks states that in a case of glaucoma secondary to a tubercular uveitis, he obtained a decidedly positive test for globulin in the aqueous. Because of the above conditions he concludes that the acute glaucoma is due directly to the changes which have occurred in the aqueous humor and the inability of the lymph spaces at the filtration angle of the anterior chamber to permit of proper filtration because of these changes.

REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. ELLICE M. ALGER, Secretary.

MONDAY EVENING, MARCH 17, 1919. ARNOLD KNAPP, M.D., CHAIRMAN.

Dr. George H. Bell presented a patient with a **deep keratitis occurring after anti-typhoid vaccine,** a condition which has been observed several times in the military service abroad. (This case is fully reported in the preceding issue of these Archives.)

Col. Walter R. Parker said he knew of two similar cases and had seen one probable one himself.

Dr. Henry H. Tyson presented a case of **pituitary struma** recurring after an operation for partial enucleation of the growth two years before.

Patient, male, aged 25 years, had been operated upon by Dr. H. Cushing, Boston, Mass., on March 30, 1917, on account of poor vision in his right eye, with visual fields indicating pressure upon the chiasm. Dr. Cushing made a transfrontal osteoplastic exposure, and partial removal of the pituitary struma, which he described as a soft reddish mass protruding between the legs of the chiasm. He removed a portion about 2 *cm* in diameter, and remarked that it was surprising that the left nerve was not the more damaged of the two, as it was pushed far to the side. Vision previous to operation: O. D. = p. l., O. S. = $\frac{20}{50}$ with bitemporal hemiachromatopsia. Six weeks after the operation: V. O. D. $\frac{20}{15}$, O. S. $\frac{20}{15}$; visual fields practically normal. On October 22, 1918, he reported that about six months previous he had noticed that the vision of his left eye began to fail, with occasional headaches over left eye.

He had been taking pituitary and thyroid extracts alternately for four months; and observed some swelling of his thyroid gland about the same time, which, however, subsided later. V. O. D. $\frac{20}{30}$, O. S. $\frac{20}{60}$. November 12, 1918, Dr. George Dixon, X-rayed his sella, and stated that he would be inclined to regard it as some osseous malformation rather than indicating the presence of a soft tumor. On March 15, 1919, his vision had receded to O. S. $\frac{6}{20}$, O. D. $\frac{20}{600}$ with bitemporal hemiachromatopsia, the nasal field of his left eye being encroached upon by the blind portion to the extent of 5° from the vertical meridian with contraction for all colors in the nasal field also. The interesting features are the return of the pressure symptoms after a lapse of two years, and the fact of the corroboration of Dr. Cushing's observation of two years previous, when he considered the anatomical relations of the two nerves, he was surprised that the left nerve was not the one more affected. The patient is about to visit Dr. Cushing for another operation.

Dr. S. A. AGATSTON presented a patient with **ophthalmoplegia interna following pneumococcus conjunctivitis** The patient, a nurse, was admitted to Dr. May's service at Bellevue Hospital with a severe conjunctivitis of her left eye. Smears showed the presence of pneumococcus. Complement fixation test for gonorrhea was negative. Three weeks after the onset of the disease, the right pupil became dilated. There was no reaction to accommodation or light, either direct or consensual. Vision was O. D. $\frac{20}{30}$, O. S. $\frac{20}{20}$. Wassermann was negative. Three weeks later, there was no change in the condition. Diagnosis was made of affection of the ciliary ganglion of toxic origin, caused by the conjunctivitis in the other eye. The patient was perfectly well otherwise.

Dr. J. WOLFF presented a boy with **paresis of accommodation,** which had cleared up suddenly though only temporarily on several occasions after loss of blood sustained in such various ways as a nasal hemorrhage during a fight, and the abstraction of blood for a Wassermann test. The patient, Charles G., 12 years old, came to me on Dec. 10, 1918, with complaint that he could not read well for the past two weeks. In October, he had had an attack of grippe and on Nov. 27th his tonsils had been removed. No history of diphtheria nor of intestinal or other form of intoxication. Examination showed no organic disease

in any part of his eyes. Vision O. D. and O. S. $\frac{1}{18}$ plus, with sph. plus 0.50 D: $\frac{1}{18}$ plus. That is, the accommodative power of his eyes was not sufficient to overcome his slight hypermetropia. He could not read Jg. 1 until sph. plus 1.25 D. was added to his eyes. His range of accommodation was only about 4 D. I prescribed this glass to aid him temporarily.

On December 15th I saw him again and was told that the above condition had remained two days more. He then had a tussle in school with a playmate that cause his nose to bleed. Immediately after this he noticed that his vision was clearer and since then he has been able to read easily without glasses. Tests this day showed his accommodation to be normal.

On January 15th, he was brought to me again with the statement that he had seen well until two weeks ago. While writing in school he suddenly felt "as if something rolled down over the top of his head and he was very dizzy." Immediately he found he could not read well and this condition has remained since. I found his pupils round, equal, reacting well to light but very feebly with accommodation. Accommodative power of each eye only 5.0 D. External muscles, fundi, and fields normal. I thought of a possible brain lesion but could find no other symptoms. Still I suggested that a Wassermann test be made. As soon as the blood was drawn from his arm he again noticed that his vision cleared up and his accommodation improved. He is now able to read Jg. 1 at 8 *cm* from his eyes without glasses.

The interest in the case attaches to the two attacks of weakened accommodation of unknown origin, each of them relieved at once by a moderate loss of blood.

Dr. WOLFF presented a patient with a large **orbital abscess** without any indication of sinus disease. M. S., girl of 10, in October, 1918, had an attack of the prevailing epidemic of influenza with severe headache. Was ill for ten days but since then felt well until near the end of November, when a swelling appeared in the left upper lid which gradually became larger.

When seen by me early in December the upper lid was very red and swollen and the eyeball protruded about 5 *mm.* Motility was somewhat impaired in all directions. The swelling was painful to the touch and a deep fluctuation could be felt.

The diagnosis of orbital abscess at the inner wall was very evident.

Careful and repeated examination of the nose showed no intranasal disease whatever and no trace of discharge. The X-ray picture of the orbit and sinuses was negative.

On December 12th under general anæsthesia a deep subperiosteal abscess was evacuated and drained. The inner bony wall of the orbit was thoroughly exposed and examined, but no trace of a communication with the nose could be found. Healing was uneventful and the globe receded as the swelling disappeared.

The interest in this case is centered in the consideration of the question how the subperiosteal orbital abscess came about, in the absence of any traceable connection with the nose. I incline to the belief that at the time of the headache during her illness there was a deep ethmoidal infection which traveled along venous or lymph channels into the orbit.

Dr. A. GOLDSTEIN showed a very good example of **persistent hyaloid.**

Dr. D. H. WIESNER presented a patient with a **tumor of the macular region** in the left eye, which had been under his observation for several years without notable change. It was a mound-like elevation arising abruptly from the fundus to a height equivalent to 9 diopters, grayish white in color, and with vessels running over it. Vision reduced to fingers. The Wassermann was negative and the cutaneous tuberculin test was negative so far as the skin and temperature were concerned, but there have appeared in the retina a number of small, irregular white spots which were not there before.

Lieut.-Col. GEORGE S. DERBY, of Boston (by invitation) then read the first paper of the evening on **observations on eye work with the British and American Expeditionary forces** (published in March ARCHIVES).

Capt. G. H. GROUT read the second paper of the evening on **experiences in reparative surgery after war injuries of the eyes** (published in March ARCHIVES).

MONDAY EVENING, APRIL 21, 1919. ARNOLD KNAPP, M.D., CHAIRMAN.

Dr. HENRY A. RILEY presented a case of **conjugate deviation to the eyes with hemi-astereognosis** (published in this issue).

DISCUSSION: Dr. WARD A. HOLDEN. We are all indebted to Dr. Riley for his admirable working out of the anatomical lesions underlying the complex and unusual group of symptoms that his patient presents.

As oculists, we see from time to time paralysis of lateral version of the eyes, or paralysis of ocular gyration as the French neurologists call it, but we have been inclined to accept a simpler interpretation. Indeed, since every eye muscle is supposed to have a cortical representation in both cerebral hemispheres, it has been believed that these paralyses are rarely due to a supranuclear lesion. The pontine and principal center of ocular gyration to one side is the abducens nucleus of the same side which, through the posterior longitudinal fascicle, controls the internal rectus of the opposite side. And, apart from the transitory spasmodic conjugate deviations of apoplexy, the great majority of these paralyses are due to a lesion involving the abducens nucleus. Since extension of such a lesion laterally or dorsally would involve the facial nerve trunk and extension ventrally would involve the motor pyramidal tract, we find that many of our patients, if kept under observation long, develop a facial palsy on the side of the paralysis of gyration or a muscular weakness of the body on the opposite side.

Such classical cases we may ourselves interpret, but for the interpretation of unusual cases such as the one presented by Dr. Riley, we must rely upon the superior anatomical attainments of the neurologist.

Dr. E. M. ALGER presented a patient with **sarcoma of the lacrimal gland** removed five years ago and so far without recurrence. The growth had been noted four years before, caused the characteristic displacement of the eyeball, and was easily palpable. There was a central choroidal lesion, vision being reduced to $\frac{20}{200}$ and minimizing any diplopia. Wassermann was negative. The growth was removed under general anæsthesia, through an incision in the outer half of the eyebrow. It was enclosed in a thin capsule which ruptured, but both the gland and its accessory were removed. Healing was uneventful, the displacement of the ball disappearing entirely. The tissue was submitted to Dr. G. S. Dixon who reported that it was a sarcoma of the gland and in his opinion likely to recur.

The case was interesting because pertinent to one of the papers of the evening, because of the long period without recurrence in spite of rupture of the capsule in the operation, and because it illustrates how comfortable an eye can be without any lacrimal gland, the secretion from the various accessory glands being sufficient to keep it moist. This case bears out the contention of several writers that adenosarcoma of this type has a very low malignancy and offers a relatively good prognosis.

Dr. ALGER also presented a woman of 50 with a **sarcoma of the iris in the ciliary body.** It was first noted as a pigmented spot some two years before, and on the advice of an optician was disregarded. The growth apparently sprang from the root of the iris, was about five millimeters in diameter, and projected forward almost to the cornea. The tension of the eye was slightly raised. Half-way between the limbus and the insertion of the internus were several small points of black pigment indicating impending perforation of the sclera. Transillumination showed an opaque mass in this region and the whole ciliary body appeared as a very dark shadow, entirely different from the appearance of the other eye. She had a mass, possibly malignant, in her liver. The question was as to the advisability of removing an eye which was not troublesome in any way and had fair vision, in view of the liver condition.

He proposed, before operating, to have her very thoroughly examined for other evidences of metastatic growths.

DISCUSSION: Dr. C. R. HOLMES, of Cincinnati strongly advised enucleation. He remembered a similar case in which early operation was refused and over 1200 separate metastatic nodules appeared before death. Dr. W. E. LAMBERT and Dr. J. E. WEEKS concurred in the advice, the latter thinking that evisceration of the orbit was indicated if the growth had actually passed outside the sclera. Results even in such cases were not entirely hopeless though even in the uncomplicated ocular sarcomata from 50 to 60% showed recurrence or metastasis under five years.

Dr. E. S. THOMSON showed the stereographic radiograph of an **orbital tumor** in a woman of 48 who came to him in January, 1913, after an extensive operation by Dr. J. A. Bodine for the removal of a growth in the sphenomaxillary fossa. A large mass of tissue was removed involving the floor of the

skull. It was supposed to be an osteosarcoma though this was not definitely determined. The present plates showed an extensive bony thickening of the orbit which is filled with a soft mass, most probably sarcomatous. It was evidently inoperable.

Dr. ALFRED WIENER then read a paper on **some critical remarks on the radical treatment of epiphora** (published in this number).

Dr. CHRISTIAN R. HOLMES, of Cincinnati (by invitation), read a paper on **extirpation of the lacrimal gland. Its value in all cases of incurable obstruction, or after removal of the lacrimal sac** (published in this number).

Dr. SIDNEY YANKAUER: The speaker has dwelt upon the fact that after the removal of the lacrimal sac it is usually necessary to remove the lacrimal gland also in order to stop the epiphora. My own limited experience has taught me that the epiphora is not relieved by any of the operations which have for their object a large opening into the middle meatus. For not only does the opening in the middle meatus tend to close in nearly every case, but such an opening destroys the physiological function of the lacrimal apparatus. For the lacrimal canal does not end at the so-called nasal orifice of the bony canal, but it extends backwards as far as the posterior end of the lower turbinate bone. If the outer nasal wall be examined from the interior of the antrum, it will be found that the lacrimal canal and the space under the lower turbinate form one continuous curved passage. This view of the continuation of the lacrimal passage to the posterior end of the lower turbinate is further substantiated by the observation that upon syringing the sac from the conjunctival side, the fluid does not escape from the nostril, but invariably runs back into the nasopharynx. The importance of this observation lies in the fact that the lacrimal duct is a siphon, of which the canaliculi form the short arm, the sac forms the bend of the siphon, and the duct itself forms the long arm. Any interference with the siphon retards the flow of the tears into the nose. Toti states that there is more epiphora when the canaliculi have been slit than when they have not been slit; when the sac has been excised there is always some epiphora; when a communication has been established between the sac and the

middle meatus of the nose, there is an opening into the bend of the siphon, and the siphonage is destroyed, with resulting tearing. In this type of operation not only does the opening have a decided tendency to close, but as long as it remains open, the patient is continually blowing his nose through the opening into the conjunctival sac.

The operation which the writer has performed in these cases was developed as the result of practical operative experience, but nevertheless is based upon these theoretical considerations. It has for its technical object the removal of the inner and anterior walls of the bony canal, followed by slitting up the entire length of the membranous passage. In this way all obstructing constrictions are removed, whether they be in the bony or in the membranous parts, below or above. The technic has been described in detail in the *Laryngoscope* of December, 1912, and as it has not been changed since then, I will not repeat it now.

The result of the operation has been quite satisfactory, all but a small proportion of the cases having been relieved not only of their suppuration, but of the epiphora also.

Dr. E. S. THOMSON said he had read Dr. Holmes's original paper on the subject many years ago, and did at the time a good many operations, perhaps thirty. He then had an orbital hemorrhage in a patient whose gland and sac had been removed at the same sitting. The wound healed nicely but optic atrophy followed. Since then he had removed the sac as a routine and the gland less often.

Dr. A. E. DAVIS said he preferred the removal of the sac after the method of Meller, and had not interfered with the gland if the result was sufficient. He thought there must be some reason why the operation had not been more widely adopted.

Dr. ERVIN TÖRÖK removed the sac in practically all cases of epiphora. He had done a few Toti operations, perhaps twelve or fifteen, and abandoned the method as unsatisfactory. Probing had seldom proved of permanent value in his hands, nor had removal of the accessory gland. He thought the removal of the main gland not as easy as it sounds, the orbital fat being sometimes troublesome. Hemorrhage must be checked.

Dr. T. R. CHAMBERS had treated his cases of epiphora for twenty years by injecting adrenalin and cocaine and afterward passing a No. 9 Bowman probe. He had been perfectly satisfied by the procedure in most cases.

Dr. WALTER WEIDLER deprecated a good deal of the surgery done on both sac and gland. In most cases he had been satisfied with the results obtained by judicious probing and had not found it either tedious or especially painful.

Dr. A. J. HERZIG had seen a number of the cases of Dr. Wiener and been very much impressed by the results obtained.

Dr. A. E. PRINCE, of Springfield, Ohio, wrote that he had operated upon about 300 cases of lacrimal obstruction during the past four years in the following manner:

After slitting the canaliculus and enlarging the opening into the sac with sharp pointed Stevens scissors sufficient to admit a large probe, a gouge 4 *mm* in diameter is introduced, held at an inclination of 45° laterally and 30° forward. A blow of a mallet drives it directly into the middle meatus. By means of a circular punch with a conical end the bone and soft tissues surrounding this opening are removed. A large communication is thus established and a very large probe can be introduced at intervals by the patient himself. Fifty per cent. of the cases thus operated upon had permanent drainage and were free from tearing. The balance required a second operation which consisted in the following: A cataract knife is introduced through the scar tissue occupying the field of the fistula. The punch is again introduced and the opening enlarged and the probe treatment begun. Eighty per cent. of those operated upon the second time are cured, as the nasal epithelium joins that of the lacrimal sac. About 10% of the cases have failed. Some of these failed to drain, although there is a very large opening from the sac into the nose. In others the opening has again closed after the second operation, while some have ceased treatment.

Dr. WIENER in closing the discussion complimented Dr. Yankauer very highly on his technique but did not think the final result likely to be at all permanent. He was pretty sure they would all end like the Toti cases, the opening closing.

Dr. HOLMES wished to emphasize the view that tear sac troubles always began in the nose and should be treated from that

point too. Only a man who had practical experience in both branches could appreciate the immense importance of sinus and nasal conditions in eye diseases. He, too, thought the opening made in the Yankauer type of operation was sure to close in the end, and could not see any reason for wasting time with probes when the whole trouble could be removed with the sac and gland.

Dr. S. AGATSTON presented a child with a **congenital coloboma of the macula** in both eyes, a girl, 11 years of age, complaining of poor vision since infancy. There was a relative central scotoma in both eyes but no nystagmus. Eccentric vision was $\frac{20}{100}$. The patient never learned how to read or write. The fundi showed a well-defined circular area at the location of the macula, in which the white sclera was marked by the presence of choroidal blood-vessels and irregular patches of pigment. The only other possible diagnosis could be congenital central choroiditis. Wassermann test was negative.

REPORT OF THE TRANSACTIONS OF THE OPHTHALMOLOGICAL SECTION OF THE ROYAL SOCIETY OF MEDICINE.

By Mr. HENRY DICKINSON, London.

A meeting of the Section was held on Friday, March 28th, Mr. W. T. Holmes Spicer, President of the Section, in the chair.

Mr. Elmore Brewerton exhibited a patient whose retina presented a peculiar series of **angeoid streaks.** He brought the case because of the extensive character of the change, and though the condition seemed to be rare, he understood Mr. Spicer had seen the appearance in more than one of his cases. On looking into the literature, he found that Ward Holden attributed such streaks to the remains of diffuse hemorrhage in a linear direction through the layers of the retina. But the exhibitor could not imagine blood to follow such lines, except in the nerve fiber layer, and these streaks were not in that, but posterior to it. W. T. Lister believed the streaks to be vestiges of new vessels along whose course were arranged exudates which had undergone secondary pigmentation. The streaks in this case, however, Mr. Brewerton did not think were new vessels, as, in the left eye, they met in a lake or pool round the disk, and one could not think of a vessel extending all the way round the disk. In a case reported by Zentmayers that observer said an extravasation of blood was present while the streaks were visible. His own view was that the streaks were the remains of hemorrhage between retina and choroid. Their brown color reminded him of hæmatin.

The President did not think any explanation yet given of these appearances was satisfactory. He had a brother and sister with an identical condition, except that the pigmentation

in those was more marked than in Mr. Brewerton's case. All four eyes of those two patients were involved in the same way. In them, it seemed impossible to escape the view that the lines were essentially blood vessels. Another case in which he saw the streaks was that of a very anæmic man, whose condition of health was due to severe hæmatemesis. In the present case the streaks were not on the surface of the retina, as the retinal vessels could clearly be seen coursing over them; their position must be between retina and choroid.

Miss ROSA FORD showed a patient with **congenital pigmentation of the cornea,** the pigment appearing in vertical lines.

The PRESIDENT mentioned cases of the kind he had seen, the pigmentation being quite deep, and the lines being, as in this case, vertical. It was not uncommon to meet with staining apart from ulceration, in which case there might not be vessels in the site.

Miss FORD also showed a case of what she regarded as **pituitary tumor,** though she was unable to find signs of disturbance of pituitary secretion. There was, however, marked contraction of fields and left homonymous hemianopia and a scotoma in the right field of the right eye. Skiagraphically, the sella turcica appeared to be normal.

Mr. GRIMSDALE exhibited a patient with a **pulsating tumor of the orbit** which he regarded as aneurysmal. It appeared to be connected with the supraorbital vessels, and compression of the carotid artery on the same side caused the pulsation to cease. The patient was only 13, a very unusual time of life for such a tumor.

Mr. RAYNER BATTEN showed a patient with **disease of both maculæ.** Three years ago she had acute papillitis, and in the course of a fortnight lost her sight completely. Three months later she could just discern light. She now had opaque white disks and symmetrical disease of the maculæ. A feature about similar cases he had seen was, that the condition occurred at about puberty. This girl had no menstruation for a year.

Major CARRUTHERS showed an **intraocular growth** in a soldier back from the Rhine Front. When seen, the left eye was much proptosed, and X-rays showed an increased shadow on the left side. The Wassermann test proved negative. The his-

tory given by the man was one of four months—the papers had not come through—and the first symptom noticed was diplopia. He had 4 D. of optic neuritis. The growth was quite hard. On the advice of a colleague, the man was put upon mercury and iodides, and this was soon followed by a remarkable chemosis, entirely of lymphatic nature: there was no redness, congestion, or vascular engorgement. After 48 hours, this cleared up, and the proptosis and optic neuritis subsided a great deal. He was hoping it would turn out to be a gumma, and therefore curable. But the improvement stopped short of cure, and recently there had developed keratitis punctata. He believed the sinuses to be normal.

Mr. A. W. ORMOND showed a case of **pituitary tumor.** At first he thought the optic discs were involved secondarily to some nasal trouble, therefore he handed the case over to his rhinological colleague, who explored both antra and the sphenoid, and removed the anterior end of each turbinal, but without finding anything very definite amiss. He then had the skull skiagraphed, and found the sella Turcica much enlarged, so that the body of the sphenoid seemed to be eroded away. The visual fields were atypical, as the hemianopia was more on the nasal than on the temporal side. The optic neuritis on both sides, the fact that the patient was gaining flesh, and the general picture, taken with the X-ray disclosures, made him strongly suspect a malignant tumor of the pituitary body. He asked for opinions as to whether puncture should be done through the sphenoid, on the chance of relieving the patient if it should prove to be a cyst.

Mr. J. H. FISHER agreed there was great probability that this was malignant growth with very extensive destruction of the sella Turcica. The absence of the typical signs of a tumor starting in the pituitary body, and the absence of the secondary phenomena which pituitary tumors manifested in other parts of the body, pointed to its malignancy. He did not advise puncture.

Mr. L. V. CARGILL also showed a case of **pituitary tumor,** in a man æt. 22, who looked 16. He had left temporal hemianopia and contraction of the right field. Both discs were pale, and there was considerable enlargement of the pituitary fossa, especially antero-posteriorly.

Mr. J. H. FISHER said this case was much more like one of primary disorder of pituitary than Mr. Ormond's. There were disturbances in the secondary sexual characteristics, and the extension in the sella Turcica was of a more typical character. He still had under observation a patient, now 35 years of age, in whom the pituitary trouble had been in abeyance for 20 years. In him there was infantilism, coupled with the secondary sexual characteristics remaining undeveloped. He thought an attempt should be made to differentiate cases of disease of the pituitary body itself, and those in which the growth was in its neighborhood.

Dr. JAMES TAYLOR agreed with Mr. Fisher's view. Before anything of an operative nature was undertaken, he counselled feeding the patient upon pituitary extract. If that did not succeed in giving relief, perhaps benefit would be secured by operation, especially if it proved to be a cyst. Mr. Cargill replied that this patient had been fed upon the extract of the gland.

The same subject was dealt with in a paper by Captain MAXTED. The patient had the usual symptoms. His diplopia was preceded by intermittent headaches, not severe. The right palpebral fissure was wider than the left: the right pupil semi-dilated and fixed: no consensual reaction. There were attacks of epistaxis, which were attributed to a pharyngitis. He had increasing anæmia. Lumbar puncture showed that the cerebrospinal fluid was under considerable tension. The fluid gave a negative Wassermann. Later the patient became dizzy. The trans-sphenoidal decompression greatly relieved the headaches. The right sphenoidal sinus was explored and found to be filled with a soft hæmorrhagic mass, resembling growth: the posterior wall of the sinus was destroyed. On recovering from the anæsthetic, the patient noticed that his sight was much worse, and in a few hours he was practically blind. On the following morning he was completely blind, and neither pupil reacted to light. Five days later the blindness began to clear up. Ten days after the operation vision was R. $\frac{1}{60}$, L. $\frac{4}{60}$: six weeks after operation R. $\frac{6}{60}$, L. $\frac{6}{24}$. The hæmorrhagic discharge from the nose continued, the anæmia progressed. A further exploration of the nose was carried out, and vascular growth removed. A tube

of radium, of 100 mgs. strength, was inserted, but five days after that the temperature went up, the patient became delirious, collapsed, and died. **Post mortem,** a large growth was found in the region of the sella Turcica, with the optic chiasma stretched over it. There was much erosion of surrounding structures. Both cavernous sinuses were extended to three times the normal size with masses of tumor. There was great destruction of bone in the middle area of the base of the skull.

The paper was discussed by Mr. Fisher and the President.

Mr. J. HERBERT FISHER read a paper on **migraine.** He said the primary classical symptoms of the condition were the scintillating scotomata, followed by localizing, and usually unilateral, headache, which latter culminates in nausea, or even vomiting. In his own case at least two others had been constant: a marked reduction in the pulse rate during an attack, and a definite increase in renal activity, resulting in copious pale urine. He had never experienced one of the type-symptoms, disturbance of vision. His headache was always in the left temporo-frontal position, and nausea was usual. His attacks usually lasted 48 hours. Sometimes his pulse, during attacks, was as low as 46 beats per minute. During a severe attack his alimentary activity appeared to be in abeyance. Often in this disease there was a familiar tendency. In the female the attacks often coincided with the menstrual periods, and in many cases they ceased during pregnancy, ceasing for good with the onset of the climacteric. In the male the attacks usually stopped at about the fiftieth year. The migraine spectrum usually lasted 20 to 30 minutes, as contrasted with the few seconds' duration of the visual aura of epilepsy, the latter also being much more highly organized. It probably had a different explanation in the two conditions. The migraine spectrum was always symmetrical, but various parts of the field might be involved. He thought the visual spectra of migraine were produced by irritation of the visual nerve fibers at the base of the brain. The hemicrania developing on the side opposite to the homonymous scintillating scotoma well agreed with the idea that the scotoma was initiated in the optic tract. There appeared to be only one region in which a lesion, varying in character, could reach the various parts of

the basal fibers, so as to explain all varieties of the migraine scotoma, namely, the inter-peduncular, and he now suggested the pituitary body as the exciting agent. Slight swelling of the hypophysis would result in sufficient pressure to cause irritation of visual fibers in any of the required positions. And the cessation of migraine during gestation, when the pituitary was greatly modified, and at the climacteric, when the sex power was on the wane, all seemed to favor the view. So also did the renal activity, for the pituitary secreted a hormone which has a direct effect on renal epithelium. He had not expected to find visible changes in the region by X-rays, because there were probably no bone changes.

Dr. GORDON HOLMES pointed out that Mr. Fisher's suggestion had already been put forward by another observer, the reference he would supply. He was sceptical about the theory. If it were true, one would expect to find migrainous phenomena pretty frequently in pituitary tumor cases, in those in which that body was enlarged, either by tumor formation or physiologically. He was not aware of such phenomena occurring in those cases. His own migrainous attacks were marked by definite visual changes.

Dr. JAMES TAYLOR thought the condition of the blood pressure would be a better guide to pituitary influence than pulse rate. He looked upon migraine as simply evidence of cortical irritation.

Mr. LESLIE PATON described in detail the features of the migrainous attacks to which he had been subject for a number of years, an interesting point in which was the perception of an organized complex visual aura, always in the same setting.

Mr. M. S. MAYOU was similarly afflicted, and his attacks were cut short by copious libations of Contrexville waters.

Mr. J. H. PARSONS, F. R. S. and Mr. J. B. STORY continued the discussion.

COMBINED MEETINGS OF SECTIONS OF OPHTHALMOLOGY AND LARYNGOLOGY

These Sections held a combined meeting on Wednesday, April 2d, Mr. W. T. HOLMES SPICER occupying the chair. The subject of discussion was:

Injuries and Inflammatory Diseases Affecting the Orbit and Accessory Sinuses

The CHAIRMAN expressed the hope that great good would come from the present meeting, which arose from the desire of ophthalmic surgeons to know a great deal more about the dangers which beset the precious optic nerve in its course from the eye to the brain. He remembered the time when there was but little expert knowledge concerning the ethmoid and frontal sinuses, and when the departments of Ophthalmology and Laryngology at large hospitals were in charge of physicians, and the outlook upon them was purely medical. It was very important that the ophthalmologist should know when to call in an expert to deal with defective sinuses.

Mr. L. V. CARGILL opened the discussion. It was, he said, surprising to find that cases of optic complications from sinus trouble were so few, because of the thinness of the partition dividing sinus from orbit. Ophthalmic complications might present themselves as functional disturbances, or as toxic effects. There might be contraction of the peripheral field, central scotoma, papillœdema, papillitis, uveitis, episcleritis, sub-retinal effusion, retinal detachments, and so on. Nasal sinusitis was a chief cause of orbital inflammation. There was a small group of cases comprising retrobulbar conditions, and a larger one consisting of sub-periosteal inflammations caused by extension from the nasal sinus. In ethmoidal cases, an acute specific fever seemed to be the usual primary cause. In young children, acute cases often responded to fomentation and good nursing. He asked whether the staff of ophthalmic hospitals should not include a rhinologist. If, in suspected sinusitis, expectant treatment was not succeeding, an exploratory incision should be made without delay. In this war, the proportion of injuries inflicted by shell fire compared with those by rifle bullets was higher than in the South African War, and the sinuses had suffered in a correspondingly greater degree. Practically every case in which the wound was purely orbital had made a good recovery. The general results had been definitely aided by anti-tetanic serum, stereoscopic radiography, the telephone probe, and the electro-magnet. No attempt had been made to remove deeply situated foreign

bodies unless they were causing definite trouble. The essence of sinus treatment was efficient drainage and irrigation. He described and illustrated a variety of cases.

Mr. G. SECCOMBE HETT remarked on the benefit of such co-operation among experts, not only in regard to the more efficient treatment of war injuries, but also cases of injury met with in industrial practice and in disease. His experience during the last three years had been with cases from the war after their arrival in England. The best results followed free drainage and as little movement of bony and soft tissues as possible. Mucous membrane was stitched to skin, and was not taken away. In a number of cases he had been able to re-constitute an eye socket because the conjunctival mucous membrane had been retained. He showed an instructive selection of slides illustrating treatment in a variety of conditions.

Mr. A. W. ORMOND based his contribution on the cases which had come under his care at the 2d London General Hospital during the last four years, and in particular on 100 cases. He could not say that serious damage to orbit or sinuses had resulted in any subtle change in vision: the results were those of the original injury, or of inflammatory change set up by it. In some patients there was optic neuritis in the uninjured eye. Pain arising in consequence of inflammation of the sinuses was sometimes referred by the patient to his eye. In two cases, blind eyes had been removed on account of severe pain supposed to originate in them, but it was found to have arisen in the nasal condition. Sometimes a deep wound was found to have affected four sinuses.

Mr. E. D. DAVIS spoke of his experiences in this connection at casualty clearing stations. He had been struck with the frequent occurrence of a fissure-fracture of the roof of the orbit when making post mortem examinations in cases of bullet wounds of any part of the skull. Fracture of the anterior fossa was accompanied by diffuse intradural hemorrhage, and these cases usually succumbed in twenty-four hours. Even if this period was survived, death took place in from three to six days, from basal meningitis, due to infection of the wound cavity. In cases of sinus injury, he regarded early suture as very important. He asked for opinions as to the wisdom of draining severe orbital cellulitis through the nose.

Suppuration of the antrum, of nasal origin, was nearly always accompanied by suppuration of other sinuses also, but in cases where the suppuration in the antrum was due to the condition of the teeth, the antrum remained the only cavity involved, and in such cases no retrobulbar neuritis had been recorded.

Mr. H. D. GILLIES expressed his objection to the early suture advocated by Mr. E. D. Davis. In the honeycomb presented by the sinuses one could not excise the whole wound, and early suture meant giving a good deal of trouble in the later stages of (restorative) treatment. Excision of the wound in a fleshy part was quite justifiable, but it was not possible in the sinus region. In the next Bolshevik war the best practice would be found to be to keep entrance and exit wounds open as much as possible, so as to permit of efficient drainage until no question of suppuration remained. Very great benefit had resulted in the treatment of war injuries by the coöperation of the dental and the plastic surgeon, and he hoped much from the combination of the efforts of rhinologists and ophthalmic surgeons, of which this meeting was an earnest.

Mr. D. LEIGHTON DAVIES spoke of the effects of nasal sinus affections on the fields of vision and on the ocular muscles. Some cases of heterophoria were secondary to sinus affections. The fields should always be studied, because patients did not make voluntary complaint in this respect. He had never met with a case of chronic nasal suppuration which did not show some changes in the visual fields. There might be scotoma, or an enlargement of the blind spot. When sinus disease had been operated upon, the blind spot enlargement subsided, only to again enlarge if the nasal trouble returned. Even when the field of vision was reduced to 10 degrees, he did not find the patients complain of difficulty in orientation. If the sinus trouble had been long-lasting, its cure did not always result in complete restoration of visual fields. In discussing the etiology, he said no one theory yet advanced would account for all the cases. The discharge from the involved sinuses, being swallowed, set up a toxæmia, which so spread to the eye. If that were true, one might expect to find contraction of visual fields in association with suppuration in other parts of the body, but he had not yet found that in sufficient numbers to warrant the drawing of conclusions. He had, however, found

contraction of fields in cases of chronic suppurative osteomyelitis, chronic otorrhœa, and leucorrhœa with endometritis.

The debate on this subject was resumed on April 10th, the chair being occupied by Dr. JAMES DONELAN, the President of the Section of Laryngology.

Mr. W. M. MOLLISON, in reopening, said most of the cases of the kind under discussion which he had seen were those which had been under the care of Mr. Ormond on account of damage to the eyes, and he did not see them until some months after the receipt of the injury. He had been impressed with the amount of time and trouble and suffering on the part of the patients which might have been saved if an ophthalmologist and a rhinologist had attended the cases from the commencement. This was specially so in the cases in which drainage into the nose might have been effected before any attempt was made to repair lids or sockets. When the latter had been done there was often a persistent pus discharge. He divided the cases he had seen into clean through-and-through bullet wounds, and secondly all other kinds. The usual result in the former was adhesion between outer wall and septum. Infection of sinuses was generally a sequel of the obstruction. All the cases he saw—at St. Dunstan's—were blind, some completely so. In one case, in restoring the nasal air-way, he opened an adhesion between the septum and ethmoid, and infection of meninges took place. The result appeared to be very good, but three weeks afterwards the officer developed meningitis and died in three days. In some there was parosmia, due to damage of the olfactory nerve. Among the men at St. Dunstan's he found the sinus most frequently affected was the frontal: the proportion was 13 frontal, 2 antral. In some cases the deep wall of the sinus had been fractured and dura mater exposed. One man was wounded by a shell in May, 1917; shrapnel entered the right side by the canthus, and he had a sinus round the right inner angle of the orbit. At the operation a very extensive ethmoiditis was found, and there was a large piece of khaki clothing in the ethmoid, which had been there seven months. He had not yet discovered a case of sinus suppuration in con-

nection with retrobulbar neuritis, though he explored in a routine way with a Killian's speculum. He had seen only one case of orbital cellulitis which could be called idiopathic. It was that of a girl who was admitted into Guy's Hospital desperately ill. He could find nothing wrong with the sinuses. She died in two days of most extensive pyæmia, and no primary source could be discovered. In 99% of these cases he thought the sinus at fault was the frontal.

Mr. J. F. O'MALLEY said he had notes of about 60 cases of trouble in nasal and accessory sinuses in which there were also eye lesions and injuries of the lacrimal apparatus. In the case of wounds of the ethmoid he had found that where there was previous obstruction sepsis was invariably present, and free incision and thorough drainage were needed. But he had been struck by the fact that in a large percentage of his ethmoidal cases there was so little sepsis that extensive treatment was not called for beyond the removal of adhesions. In the case of gunshot wounds, there was great facility in healing once a good air-way had been reëstablished: this in contrast with ordinary ethmoid involvement secondary to nasal inflammation. Much the same could be said of antral lesions. Out of 50 through-and-through wounds of the antra he had only to operate on 11 for sepsis; in 11 others he operated for the removal of foreign bodies. He had 18 cases of eye involvement: in 10 the eye was lost, in 8 there were injuries to it of varying degree. Where the injury to the eye was not direct, it seemed to have been caused by the missile striking the malar bone and the shock of impact being communicated to the bony wall of the orbit. In some cases where epiphora resulted, this did not give much trouble in the ordinary way, but when playing games in a high wind, or motoring, the overflow of the tears was a nuisance. He thought the cause was hypertrophy of the inferior turbinate due to exposure to the winds, and as a result of its engorgement pressure was exerted on the tear duct. Removal of a portion of the soft tissue of the anterior turbinate seemed to cure this climatic cause of overflow.

Mr. G. H. POOLEY said orbital cellulitis was often due to extension of inflammatory trouble in the superior ethmoidal sinus or from the lacrimal apparatus. In children, orbital cellulitis was often due to osteomyelitis in the frontal or eth-

moidal region, and frequently these cases die. The best treatment was free incision, and the generous use of the sharp spoon. Defective vision due to nasal conditions he thought was attributable to pressure on the optic nerve, or to toxic influence on the retinal cells. He described three classes of cases.

Mr. W. STUART-LOW spoke of cases in which œdema spread to the canthus from inflammation of the frontal sinus. In some of the cases sent for operation, in which the middle turbinal was swollen and was blocking the passage, he avoided operation by using cocaine and adrenalin, following that, after an interval, by fomentation. He did not operate until he had tried some such measures. Relieving the tension in a sinus, which might be due simply to serous fluid, was of great benefit. If these means failed, he received the patient into the hospital and incised freely under the eyes. He refrained from washing out the frontal sinus, for fear of driving infecting material into other sinuses. Removal of two thirds of the middle turbinal often succeeded. He also made a practice of using a cage over wounds of sinuses and ears, to obviate pressure from outside, and he believed that had much to do with preventing or reducing subsequent deformity. Some of his lacrimal cases he failed to cure, and then he generally found some small foreign body was the cause of failure. He employed washing out in the case of the antrum, for its partition, though thin, was complete. When a portion of shrapnel or casing was deeply embedded, he did not attempt removal unless it was giving the patient trouble.

Mr. HERBERT TILLEY showed photographs to demonstrate that ethmoidal cells and frontal sinus were developed quite early, even at three years of age. He also exhibited skiagrams of cases. He said that sometimes frontal sinus inflammation caused contralateral retrobulbar neuritis. Subjects of sinus suppuration seldom complained of eye symptoms, and even when asked directly about them did not admit such. In cases which had been referred to him by ophthalmological colleagues, having gone to them because of retrobulbar neuritis, he seldom found sinuses involved, which he attributed to the fact that the originating nasal trouble had cleared up in the meantime. The rapidity with which eye symptoms cleared up when nasal trouble was treated seemed to show that the cause was pres-

sure of fluid rather than actual sepsis. Radical measures should never be undertaken during acute intranasal infection: it might mean disaster to the eye, or even to life. At this stage the surgeon should be satisfied with providing free drainage. He had seen iritis, cyclitis, and some internal affections of the eye quite cured by intranasal operations. He had never seen a case of orbital cellulitis in which sinus suppuration was not present.

Mr. LAWSON WHALE brought out, by means of an epidiascope demonstration of selected skiagrams from his war experiences in France and England, a number of points of practical importance in diagnosis and treatment.

After a few closing remarks by the Chairman, the four openers briefly replied.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY FOR THE FOURTH QUARTER OF 1918 AND THE FIRST QUARTER OF 1919.

By H. KOELLNER, Berlin; W. KRAUSS, Marburg; R. KÜMMELL, Erlangen; W. LOEHLEIN, Greifswald; H. MEYER, Brandenburg; W. NICOLAI, Berlin; H. PAGENSTECHER, Strassburg; K. WESSELY, Würzburg; and M. WOLFRUM, Leipsic; with the Assistance of Drs. ALLING, New Haven; CALDERARO, Rome; CAUSÉ, Mayence; CURRAN, Kansas City; DANIS, Brussels; GILBERT, Munich; GROENHOLM, Helsingfors; v. POPPEN, Petrograd; TREUTLER, Dresden; and VISSER, Amsterdam.

Edited by MATTHIAS LANCKTON FOSTER, M.D., F.A.C.S., New Rochelle, N. Y.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

1. COULOMB, R. **The disinfection of artificial eyes.** *Annales d'oculistique*, clv., 4.
2. FRIEDENWALD, H. **Ophthalmoscopic conditions simulating sarcoma of the choroid.** *American Journal of Ophthalmology*, December, 1918.
3. LANDOLT, MARC. **Regarding the question of hereditary changes produced by artificially induced somatic modifications.** *Archives d'ophtalmologie*, xxxvi., 1.
4. RASQUIN, E. **The determination of "professional" visual acuteness and the evaluation of visual reduction caused by military service.** *Annales d'oculistique*, clv., 3.
5. TERRIEN, F. **A simple method of recognizing simulated diplopia.** *Archives d'ophtalmologie*, xxxvi., 1.
6. VON DER HEYDT, R. **Ophthalmoscopy with red-free light of Vogt.** *American Journal of Ophthalmology*, February, 1919.
7. WHEELER, J. M. **Paralysis of the sixth cranial nerve associated with otitis media.** *Journal of the American Medical Association*, November 23, 1918.
8. WILMER, W. H. **The effect of altitude on ocular functions.** *Ibid.*, October 26, 1918.

COULOMB (1, **Disinfection of artificial eyes**) found that a new artificial eye is more easily sterilized than an old one.

The only practicable method he thinks is to immerse it for one minute in a solution of one part iodine, two parts potassic iodide, and three hundred parts water.

SCHOENBERG.

FRIEDENWALD (2, **Ophthalmoscopic conditions simulating sarcoma of the choroid**) reports the case of a bluish tumor of the fundus, 0.5*cm* by 0. 75*cm*, and about 2*mm* thick, in a girl eighteen years old. Subcutaneous tuberculin test and the Wassermann reaction were negative. As the mass was thought to be sarcoma and was increasing in size the eye was removed. The microscopic findings were typical of an infection granuloma either tuberculous or syphilitic. He also describes the case of a boy of twelve, whose right eye showed a large tumor projecting into the vitreous. There was a marked dilatation of the retinal vessels with mild optic neuritis and patches of white exudate. Under microscopic examination the mass proved to be an inflammatory exudate which was undergoing organization. These cases are known as those of massive exudation of Coats.

ALLING.

LANDOLT (3, **Hereditary changes produced by artificially induced somatic modifications**) publishes the results of an examination made by his father on several hundred guinea pigs with ocular lesions. These animals, which showed corneal changes, were the offspring of guinea pigs, in which the great physiologist Brown-Sequard had induced ocular lesions through a section of a certain portion of the brain. Landolt's studies brought out the fact that these corneal lesions were of traumatic nature and had nothing to do with the question of heredity, so that Brown-Sequard's experiments could not have any value in the controversy between Weismann and Lamarck as to the possibility of transmission of artificially induced somatic modifications.

SCHOENBERG.

RASQUIN (4, **The determination of "professional" visual acuteness and the evaluation of visual reduction caused by military service**) points out the inadequacies of the methods at present in use for the determination of the amount of reduction of visual acuteness necessary to cause professional dis-

ability, and endeavors to work out an improvement upon these methods. His idea is that the question of evaluation of the compensation for partial or total loss of sight has to be based upon the percentage of loss of the capacity for the performance of a given occupation or trade. From repeated tests of a large number of individuals he concludes that the Snellen test chart and those containing various sizes of E with the three horizontal lines equal in length, though not ideal are the most satisfactory. The paper contains a table which shows the valuation of professional visual acuteness according to the sizes of the types seen. In this table the increase of the types used follows a geometrical progression, while the corresponding professional visual acuteness follows an arithmetical progression.

SCHOENBERG.

TERRIEN (5, **A simple method of recognizing simulated diplopia**) holds a blue glass in front of the patient supposed to have diplopia and examines him with the candle in the usual manner. He then places another blue glass, but which is opaque, in front of the same eye and reëxamines the patient for diplopia. The malingerer will see double.

SCHOENBERG.

VON DER HEYDT (6, **Ophthalmoscopy with red-free light of Vogt**) describes the appearance of the normal fundus when seen by light filtered through colored fluids to eliminate the red rays of the spectrum. The nerve fibers are plainly visible and can be followed all over the fundus. The vessels are black on a light background. The foveal reflex, ordinarily seen in youth, can be seen even in the aged. The macula is yellow, and, as all pigment appears black in this light, he concludes that there is no pigment in the macular region. Fundus details and lesions are demonstrated very clearly.

ALLING.

WHEELER (7, **Paralysis of the sixth cranial nerve associated with otitis media**) describes Gradenigo's syndrome as characterized by acute otitis media, isolated paralysis of the abducens, and intense pain in the frontal temporal and parietal regions. The sixth nerve pierces the dura and passes upward and outward, in contact with the apex of the petrous pyramid of the temporal bone, entering the cavernous sinus. Any

inflammation or hemorrhage at this point would cause pressure on the nerve. The pain is explained by the proximity of the Gasserian ganglion. The prognosis is usually good if the process in the temporal bone is relieved by operation.

ALLING.

The experiments reported by WILMER (8, **The effect of altitude on ocular functions**), as part of the work of the Medical Research Board to investigate problems in aviation, were intended to show the effect of high altitudes on the eye. Both the rebreathing apparatus of Henderson and a low pressure tank were used to duplicate the conditions in actual flying. Stereoscopic effect, reaction time, color vision, field of binocular fixation, muscle balance, field of vision, perception of motion, accommodation, convergence, and retinal sensitivity were all tested under reduced air pressure. In general it can be stated that these functions were reduced but not to a marked degree until the equivalent of 20,000 feet was reached and the eyes quickly returned to normal after the administration of oxygen proving the signs observed were due to deficiency of that element.

ALLING.

II.—THE EYE IN ITS RELATIONS TO GENERAL DISEASE.

9. CLARK, H. S. **Familial degeneration with or without dementia.** *Journal of the American Medical Association*, November 30, 1918.

10. DENNIS, D. N. **A study of the conjunctival circulation to determine early signs of arteriosclerosis.** *Transactions American Ophthalmological Society*, 1918.

11. DWYER, J. G. **Focal infections of the eye from the intestinal tract.** *Journal of the American Medical Association*, December 21, 1918.

12. HANSELL, H. F. **Ocular affections dependent upon disease of the tonsils.** *Transactions of the American Ophthalmological Society*, 1918.

13. LAVAGNA, L. **Late ocular complications in cerebrospinal meningitis.** *Clinique ophtalmologique*, viii., 10.

14. LEMIÈRE, L. **Transitory amblyopia in a patient with commotion of the brain.** *Annales d'oculistique*, clv., 2.

15. NECHITCH, G. P. **A study of hemeralopia.** *Ibid.*, clv., 4.

16. TYSON, H. H. **Transient left homonymous hemianopsia.** *American Journal of Ophthalmology*, December, 1918.

Cases of familial degenerative disease may be divided into (1) amaurotic family idiocy, (2) juvenile type of the same, (3)

familial macular degeneration without dementia, and (4) the same with dementia.

There is no sharp line of differentiation between these types as, for example, the second form seems in some cases to merge into the first or third.

CLARK (9, **Familial degeneration with or without dementia**) reports two cases of the fourth type. As to the causes of these affections we are in the dark. Pathologically amaurotic family idiocy shows degeneration of the ganglion cells of the retina and central nervous system but in macular cerebral degeneration the neuroepithelium is probably the seat of the lesions.

ALLING.

DENNIS (10, **A study of the conjunctival circulation to determine early signs of arteriosclerosis**) with the aid of a Zeiss corneal microscope and a small spot light has studied the vessels of the ocular conjunctiva and finds here very early manifestations of general vascular sclerosis. He observed that the corpuscles cling to the lumen of the vessel and interrupt the flow of blood so as to leave its distal portion empty for a time, and also to cause a beaded appearance. In advanced cases of vascular sclerosis the vessels are nearly empty.

ALLING.

DWYER (11, **Focal infections of the eye from the intestinal tract**) has studied the intestinal reactions with the view to establishing a normal growth of the colon bacillus which cannot live in highly acid or alkaline media. After irrigation with either an alkaline solution or lactose, as the reaction demands, he injects a culture of the colon bacillus and gives the Bulgarian bacillus by mouth. He has had marked success in the treatment of eye diseases where of course other recognized foci of infection have been excluded.

ALLING.

HANSELL'S (12, **Ocular affections dependent upon disease of the tonsils**) two cases are as follows: Acute double optic neuritis with complete blindness. A careful examination revealed no cause for the eye lesion except diseased tonsils. Within twenty-four hours after their removal vision began to return until nearly normal, although the nerves passed into partial atrophy. The other case was chronic iridocyclitis with

acute exacerbations persisting three months. Recovery was rapid and complete commencing within a few hours after tonsillotomy. ALLING.

LAVAGNA (13, **Late ocular complications in cerebrospinal meningitis**) reports an unusual case of conjunctivitis, iridochoroiditis, and optic neuritis which appeared one year after an attack of cerebrospinal meningitis with septicæmia. The conjunctival secretion showed the presence of meningococci. After two months' treatment the ocular condition subsided, but two months later a retinal detachment appeared in the same eye quite suddenly. The author does not report on the subsequent course of the disease.

SCHOENBERG.

LEMIÈRE (14, **Transitory amblyopia in a patient with commotion of the brain**) reports the case of a soldier who, after having passed through a day of terrific bombardment, became unconscious and on waking found himself completely blind. The loss of sight gradually disappeared in the course of a few days. The eyes showed nothing abnormal during the time of amaurosis. The author believes that this transitory loss of sight was due to a commotion of the cortical or subcortical visual areas with a disturbance of the vasomotor function.

SCHOENBERG.

NECHITCH (15, **A study of hemeralopia**) has had the opportunity to examine seven hundred Serbian soldiers with hemeralopia and draws the following conclusions: (1) The condition is due to a state of exhaustion of the organism, due mainly to undernourishment, and lack of variety of food and of fats. (2) The retinal sensibility is not diminished uniformly over its whole surface. He classifies hemeralopia as (a) total; (b) with peripheric vision; (c) with eccentric vision; (d) with relative scotoma; (e) with annular scotoma. (3) Hemeralopia is almost always bilateral and never changes its character. (4) Improvement and even spontaneous cure are not rare, but not of long duration. (5) The defective nutrition reduced the photochemical reactions in the retina and thereby caused a diminished retinal sensibility. (6) The best means of treatment, in the author's hands, was cod liver oil, and subconjunctival injections of natrium chloride, 5% solution, nourishing food, iron, and arsenic. SCHOENBERG.

TYSON (16, **Transient left homonymous hemianopsia**) reports the case of a man who developed an hemianopsia after free indulgence in alcohol, the attack persisting nine days with restoration of vision. Eight months later after another spree he had a recurrence followed by recovery except for a permanent homonymous superior quadrant achromatopsia. He thinks that the attacks were due to prolonged spasm of the right posterior calcarine artery causing œdema of the cortex about the calcarine fissure. Alcohol accompanied by a constitutional migraine dyscrasia was the exciting cause.

ALLING.

III.—PATHOLOGY AND BACTERIOLOGY.

17. MAXCY, K. D. **The transmission of infection through the eye.** *Journal of the American Medical Association*, March 1, 1919.

MAXCY (17, **Transmission of infection through the eye**) introduced the harmless saprophyte bacillus prodigiosus into the conjunctival sac and recovered it from the nose in five minutes, from the throat in fifteen minutes, and from the stools in twenty-four hours. He thus proved the possibility of infection through the eye and has offered an explanation for the well-known fact that the ordinary mask is an inefficient protection.

ALLING.

IV.—INSTRUMENTS AND REMEDIES.

18. ALGER, E. M. **A new "malingeroscope."** *American Journal of Ophthalmology*, February, 1919.

19. MARBAIX. **Remarks on the utility of the Schiotz tonometer.** *Annales d'oculistique*, clv., 1.

20. TERSON, A. **The external application of mercury salicylarsenate (enesol) in ophthalmology.** *Archives d'ophtalmologie*, xxxvi.

ALGER'S (18, **A new "malingeroscope"**) instrument consists of two tubes arranged like an opera-glass. In the ends are two small apertures which can be moved nearer or farther apart. When the openings are less than the interpupillary distance, the malingerer, in looking at two exactly similar test cards about eighteen inches apart, has the sensation of binocular vision, but in fact sees the right card with the left eye and vice versa. Pretended blindness or poor vision in one eye is thus easily proved false.

ALLING.

MARBAIX (19, **Remarks on the utility of the Schiotz tonometer**) reports cases of interstitial keratitis, treated for a long time with atropine, of progressive myopia and diabetic iritis, in which the use of atropine was contraindicated by the increased intraocular tension. This condition is very apt to be overlooked when the tension is taken with the fingers. The routine examination of all eyes with the Schiotz tonometer is strongly advocated by the author.

SCHOENBERG.

TERSON (20, **The external application of mercury salicylarsenate [enesol] in ophthalmology**) praises the efficacy of mercury salicylarsenate in the treatment of corneal ulcers. He says it is far superior to either the bichloride or cyanide of mercury. Enesol is a three per cent. aqueous solution of salicylarsenate of mercury and is readily decomposed by light and air. The author recommends its use not as drops, but as a bath of the eyeball, pouring it copiously over the cornea twice a day from the original ampoule containing it. There are no contraindications to its use. The cleansing of corneal ulcers and the process of repair set in very much earlier after using this than after using any other known substance.

SCHOENBERG.

V.—GENERAL TREATMENT AND DIAGNOSIS.

21. CANTONNET, A. **The "hole in the hand" test for binocular vision.** *Archives d'ophtalmologie*, xxxvi., 3.

22. DOMEC, T. **The treatment of diverse ocular affections by intramuscular injections of sterile milk.** *La clinique ophtalm.*, viii., 10.

CANTONNET (21, **The "hole in the hand" test for binocular vision**) says that if we look at a distant object through a tube with the left eye, while we hold one hand next to the extremity of the tube so as to obstruct the view of this object from the right eye, the object will appear as if seen through a hole in the hand. This interesting experiment, devised by Cantonnet, can be very easily improvised at any time; all we need is a piece of paper rolled into a tube. The explanation given to this optical illusion is that one eye sees the object through the tube, the other eye sees the hand; both images superimposed in the brain give the impression of an image seen through a hole in the hand. The author has been using this test for

sometime for discovering malingerers, by holding the tube in front of the poorer eye. Lately he has also employed it to test various disturbances of binocular vision and seems to obtain almost the same satisfaction as from Remy's diploscope. In perfect muscular balance the images superimpose so that the hole is seen in the center of the palm, above or below. In case of a monocular vision it is either the hand or the object which is seen. Besides its diagnostic importance this method can be used for therapeutic purposes in strabismus. In this condition, says the author, after having corrected the visual acuity to the best possible degree, the most important step is to train the patient to use his eyes simultaneously. This method, easily understood even by children, stimulates in patients the attempt to see the object through "the hole in the hand" and once accomplishing this, the binocular vision is obtained. The great advantage of this method lies in the fact that the patient may repeat the experiment alone, several times daily, and train himself in the act of binocular single vision. The author has found his method very valuable for overcoming the habitual suppression of image of one eye, as is usually done by the strabismics and has obtained quick and accurate information regarding the various disturbances of binocular vision.

SCHOENBERG.

By intramuscular injections of sterile milk Domec (22, **Treatment of diverse ocular affections by intramuscular injections of sterile milk**) has obtained very gratifying results in a variety of ocular affections, choroiditis, iritis, cyclitis, keratitis, and blepharitis. The original part of his paper deals with the treatment of burns of the eye with sulphuric acid. Clinical and experimental observations lead him to the conviction that the use of milk injections together with local treatment reduces the unfortunate outcome of such burns to the minimum.

SCHOENBERG.

VI.—REFRACTION AND ACCOMMODATION.

23. FERREE, C. E., and RAND, G. **The inertia of adjustment of the eye for clear seeing at different distances.** *American Journal of Ophthalmology*, November, 1918.

24. LANDOLT, E. **The influence of age on the static refraction of the eye.** *Archives d'ophtalmologie*, XXXVI., 1.

FEREE and RAND (23, **The inertia of adjustment of the eye for clear seeing at different distances**) have studied the lag in adjustment of the eye to different distances. They think that these tests might be of practical value especially in aviation where rapid judgments are essential. The time required for 18 normal observers to focus from near to far objects varied from 0.5 to 1.16 sec. from far to near 0.39 to 0.82 sec.

The individuals tested were below thirty years of age and the few tests made with older persons would indicate that the time is slower. There seems also to be a definite diurnal variation. A description of the apparatus used is given in the paper.

ALLING.

LANDOLT (24, **The influence of age on the static refraction of the eye**) says that Donders' law in regard to the diminution of the static refraction in old age has to be slightly modified. He has seen several old patients in whom the static refraction increased in the course of time, so that myopes needed a stronger minus lens, hypermetropes a weaker plus, and emmetropes a minus sphere. This exception to the well-known and accepted law of Donders may be due to peculiar changes in the lens, like loss of elasticity, the development of an irregular lenticular astigmatism, a flattening of the lens, a change of the refractive power of the lens, and of its transparency.

SCHOENBERG.

VII.—THE MOTOR APPARATUS OF THE EYE.

25. AUBINEAU, E., and LENOBLE, E. **Nystagmus and myoclonic nystagmus.** *Archives d'ophtalmologie*, XXXVI., 3.

26. TERRIEN, F. **Advancement with a suture of reinforcement.** *Ibid.*, XXXVI., 1.

Besides the three recognized types of nystagmus, ocular, labyrinthine, and the one due to an organic lesion of the central nervous system, there appears to be another type, called by AUBINEAU and LENOBLE (25, **Nystagmus and myoclonic nystagmus**) myoclonic nystagmus. The characteristic points given with regard to this kind of nystagmus are that it varies all the time in its direction and intensity, being irregular, undulatory, vertical, etc., that it is frequently accompanied by spasmodic movements of the orbicularis, or of the muscles of the neck; that it is hereditary and usually found in several

members of the same family, pointing to a degenerative condition, which is commonly found in all the states of myoclonic; and finally that no organic lesions have as yet been found in such patients on whom autopsies have been performed.

SCHOENBERG.

In order to prevent the suture from slipping between the muscle fibers TERRIEN (26, **Advancement with a suture of reinforcement**) secures the advanced muscle by fastening it to the eyeball with an extra suture. This is passed through the sclera just behind the insertion of the tendon to the eyeball, parallel with the line of insertion of the tendon. The suture is double armed and each of its ends is brought out through the corresponding part of the conjunctiva. After the advancement has been accomplished the two ends of the reinforcement suture are tied, pressing the muscle against the eyeball. This relieves the muscle of a good deal of traction and prevents the slipping of the advancement sutures.

SCHOENBERG.

VIII.—THE LIDS.

27. BRIGGS, H. H. **Hereditary congenital ptosis, with report of 64 cases conforming to the Mendelian rule of dominance.** *Transactions American Ophthalmological Society*, 1918.

28. WEIDLER, W. B. **Solid œdema. Report of three cases.** *American Journal of Ophthalmology*, October, 1918.

Of the 128 members of the twenty-three families, including six generations, reported by BRIGGS (27, **Hereditary congenital ptosis**), sixty-four were affected with congenital ptosis. Of those affected, thirty-three were males, thirty females, and one of unknown sex. If the deformity ptosis is dominant, there should be, according to the Mendelian law of transmission, an equal number of those affected and those who are not. Further, the transmission of the dominant character is through the affected parents only, and in every case the dominant should have only one parent affected. His cases conform to these laws.

ALLING.

WEIDLER'S (28, **Solid œdema**) cases were characterized by recurrent localized œdema of the lips, cheeks, and eyelids, simulating angioneurotic œdema. The condition has been

attributed to streptococcic infection, but in these cases the staphylococcus was found twice and a diplococcus once. The cases did well under vaccine treatment and attention given to the nose.

ALLING.

IX.—THE ORBITS AND ACCESSORY SINUSES.

29. CONLON, F. A. **Bitemporal hemianopsia due to acute suppuration of the posterior nasal sinuses.** *American Journal of Ophthalmology*, February, 1919.

30. ONFRAY, R. **Congestion of one orbit and abscess in the other.** *Annales d'oculistique*, clv., 2.

31. POSEY, W. C. **Report of four cases of orbital tumors successfully removed with preservation of vision through an orbital incision along the external rim.** *Transactions American Ophthalmological Society*, 1918.

32. POULARD, A., and REAL. **Enlargement and shaping of the orbital cavity for prothesis.** *Annales d'oculistique*, clv., 1.

33. SCHWENK, P. N. K., and POSEY, W. C. **Some observations on the restoration of the orbital socket.** *Transactions American Ophthalmological Society*, 1918.

The fibers of the optic nerve going to the nasal side of the retina are in contact with the lateral wall of the sphenoidal sinus, and this wall is very thin. CONLON (29, **Bitemporal hemianopsia due to acute suppuration of the posterior nasal sinuses**) relates a case of acute sinusitis with bitemporal hemianopsia. Such cases are very rare.

ALLING.

ONFRAY (30, **Congestion of one orbit and abscess in the other**) has seen a young boy with an orbital abscess following an ethmoiditis on the right side and an œdema and congestion of the orbital tissue on the opposite side, occurring seven months later. This time the inflammatory condition gradually receded after energetic local and general treatment with hot applications, nasal applications of eucalyptol oil, and two per cent. electrargol intravenously.

SCHOENBERG.

POSEY (31, **Four cases of orbital tumors successfully removed with preservation of vision through an orbital incision along the external rim**) began his operations with the incision recommended by Kroenlein so that the wedge of bone might be removed if it was found to be necessary. All four tumors,

however, could be removed through the orbital incision. They were a spindle-celled sarcoma, a fibroma, a dermoid cyst, and an adenoma. He is favorably impressed by the operation of Magitot, which is a modification of Kroenlein's.

ALLING.

POULARD and REAL (32, **Enlargement and shaping of the orbital cavity for prothesis**) describe their method of overcoming the tendency of cicatricial bands to induce a shrinking of the orbital sockets by gradual dilatation. They use a small apparatus consisting of: (1) a plate made of hard rubber molded after and held fast to the frontal bone and the superior margin of the orbit; (2) an elastic band passed around the head, a rod of steel extending downward from this plate to the level of the interpalpebral fissure; (3) another rod directed anteroposteriorly, sliding easily in a tube provided in the vertical rod and having at its orbital extremity a discoid dilatation. After the necessary incisions have been made in the tissues of the orbit, the apparatus is fixed on the forehead of the patient, a plastic mass is introduced into the newly formed cavity and kept under pressure by the discoid end of the apparatus. The latter is removed twice daily just for the short time necessary to clean the wound. Each day a little more is added to the plastic mass and the cavity is found to have become appreciably dilated in two weeks. When it is sufficiently large vulcanized rubber is used instead of the plastic mass. The writers do not state what this substance consists of.

SCHOENBERG.

SCHWENK and POSEY (33, **Restoration of the orbital socket**) advocate the method of Maxwell for the restoration of the lower cul-de-sac. This in brief consists of the dissection up of a crescentic flap of skin just below the lid margin except at its very center. The flap is passed under the lid margin and stitched to the two edges of an incision which has been made in the conjunctiva. The skin wound is then stitched together. In this way a skin cul-de-sac is formed. For the upper lid they employ the operation of Galovine by dissecting a flap from the temple and passing it under a bridge of skin near the outer canthus. Three cases are related.

ALLING.

X.—THE CONJUNCTIVA.

34. COSMETTATOS, G. F. **Recurrent epithelioma of the bulbar conjunctiva. Death from metastasis.** *Annales d'oculistique*, clv., 1.

35. EATON, F. B. **Scar-tissue conjunctivitis in animals. Its relation to insects and trachoma.** *American Journal of Ophthalmology*, February, 1919.

36. MUSY, TH. **A case of tuberculosis of the conjunctiva caused by a tubercle bacillus of the bovine type.** *Annales d'oculistique*, clv., 3.

37. VERHOEFF, F. H. **Observations on Parinaud's conjunctivitis.** *American Journal of Ophthalmology*, October, 1918.

COSMETTATOS (34, **Recurrent epithelioma of the bulbar conjunctiva**) reports the case of a patient, thirty years of age, who presented a recurrent epithelioma with the following unusual features: It was located under the conjunctiva, it showed under the microscope a complete disorientation of the axis of mitosis, and it was very malignant. The patient died about one and a half years after the third removal of the growth from a tumor of the larynx.

SCHOENBERG.

A disease resembling trachoma, characterized by granulations and scar tissue in the conjunctiva, entropion, and corneal lesions, is known to occur in animals, especially horses, cattle, and dogs. Its relation to trachoma is uncertain. According to EATON (35, **Scar-tissue conjunctivitis in animals**) there seems to be evidence that the transference of the disease is brought about through the agency of a certain species of biting horsefly. Cases have been observed in Illinois, Nevada, and California.

ALLING.

MUSY (36, **Tuberculosis of the conjunctiva caused by a tubercle bacillus of the bovine type**) caused a generalized tuberculosis in guinea pigs by injecting them with the material obtained from broken down cervical glands from a patient who had a clinically tuberculous conjunctivitis. An emulsion of the organs of these guinea pigs was injected in a young bull, which a few months later developed miliary tuberculosis. The evolution of the disease in this animal determined the strain of bacilli to be of the bovine type.

SCHOENBERG.

VERHOEFF (37, **Parinaud's conjunctivitis**) defines this disease as a subacute conjunctivitis due to infection with a minute leptothrix and always associated with inflammatory

enlargement of the preauricular and other regional glands. The source is unknown, but his cases have lent no support to the theory of animal origin. In some cases there is a history of trauma. The essential conjunctival lesions are focal areas of infiltration under the epithelium in various stages of necrosis. It is always unilateral and is never transmitted. It occurs most frequently in winter. To demonstrate the organism he uses a modified Gram stain. Inoculation of animals and attempts to obtain cultures were negative.

ALLING.

XI.—THE CORNEA.

38. STARK, H. H. **Congenital tumor of the cornea of doubtful classification.** *American Journal of Ophthalmology*, January, 1919.

39. WEEKERS, L. **Thermotherapy of corneal ulcers.** *Ibid.*, February, 1919.

40. WEEKS, J. E. **Disciform keratitis.** *Journal of the American Medical Association*, December 7, 1918.

STARK (38, **Congenital tumor of the cornea of doubtful classification**) describes a tumor of the cornea about 8*mm* in diameter and 5*mm* high bluntly conical in shape with a ring of clear cornea about it. He dissected it off and left the cornea apparently normal in thickness and transparency. The tumor consisted of fibrous tissue and fat cells covered by epithelium. There is a question as to whether it should be called a fibroma or a dermoid. No dermoid tissue as hair or sweat glands was present but these are not necessary to substantiate the diagnosis of dermoid in congenital tumors.

ALLING.

WEEKERS (39, **Thermotherapy of corneal ulcers**) adds his testimony to the usefulness of the application of heat without cauterization. He uses a red-hot electrode which he passes over the ulcer taking care not to touch the cornea. He claims that the results are excellent and that there is no unnecessary loss of tissue. He has experimented on the eyes of rabbits comparing the effects of cauterization and chauffage, proving the advantage of the latter as far as the integrity of the cornea is concerned. ALLING.

WEEKS (40, **Disciform keratitis**) after relating three cases of this rare disease and noting the local reaction to tuberculin,

and the apparently favorable results of its therapeutic use, concludes that further observations may strengthen the view that the lesion is tuberculous in origin.

ALLING.

XII.—THE IRIS.

41. CALHOUN, E. P. **A consideration of the cause of heterochromia iridis, with special reference to a paralysis of the cervical sympathetic.** *Transactions American Ophthalmological Society*, 1918.

42. MULCAHY, T. A., and EWING, J. **Tuberculoma of the iris. Report of case with microscopic examination of the eyeball.** *American Journal of Ophthalmology*, November, 1918.

Whereas a small proportion of cases of dissimilarly colored irides are congenital CALHOUN (41, **Consideration of the cause of heterochromia iridis with special reference to a paralysis of the cervical sympathetic**) thinks that paralysis of the cervical sympathetic is responsible for a large percentage. This paralysis may be hereditary. He speaks also of a disease of unknown origin which begins usually in youth with a discolored iris, deposits on Descemet's membrane, and later cataract. It does not seem to be a true inflammatory process, but a type of vascular sclerosis. The author experimented upon rabbits and found appreciable changes in the color of the iris on the side of the complete excision of the superior cervical sympathetic ganglion.

ALLING.

The case of a child three years old is reported by MULCAHY and EWING (42, **Tuberculoma of the iris**). There was a yellowish white spherical mass about the size of a pea springing from the lower angle of the iris and extending to the pupillary edge. Two smaller tumors were also present in the angle above the larger mass. There was infiltration of the cornea over the larger tubercle, and the pupil was bound down by posterior synechiæ. The child had also enlarged phalanges. Four Wassermann tests were negative, but an injection of ¼ *mg* O. T. gave a constitutional reaction and increased circumcorneal congestion. Therapeutic injections of B. E. were started, but the child died of pneumonia complicating measles. At the autopsy the bronchial glands were found caseous and the fingers showed a granulomatous inflammation of the bone marrow and periosteum. The iris lesion consisted of

infiltrations of lymphocytes, plasma cells, and blood-vessels. Tubercle bacilli could not be demonstrated.

ALLING.

XIII.—THE LENS.

43. LIEGARD. **The suture of the cornea in cataract operations.** *Annales d'oculistique*, clv., 1.

44. MAYNARD, LT. COL. F. P. **Intraocular hemorrhage after operation for glaucomatous cataract; recovery with useful sight.** *British Journal of Ophthalmology*, January, 1919.

45. ROURE. **How I should like to be operated on for a cataract.** *Annales d'oculistique*, clv., 3.

46. VERHOEFF, F. H. **Microscopic findings in a case of coralliform cataract, with remarks on congenital cataracts in general.** *Transactions American Ophthalmological Society*, 1918.

LIEGARD (43, **Suture of the cornea in cataract operations**) says that he sutures the limbus of the cornea after each cataract extraction. His method consists of introducing the suture horizontally through the parenchyma of the cornea, about half a millimeter below and parallel with the margin of the cornea. The suture is double armed and the other needle is passed through the scleral tissue just above and parallel with the corneal margin. A large loop of the thread is left so as to allow sufficient space for the knife to make the classical incision. After the cataract extraction is terminated the upper extremities of the thread are tied.

SCHOENBERG.

Useful sight after intraocular hemorrhage following operations for glaucoma and cataract may be said to be almost unknown. In MAYNARD'S (44, **Intraocular hemorrhage after operation for glaucomatous cataract; recovery with useful sight**) experience every example of this accident has resulted in blindness. Most surgeons enucleate the eye. The case recorded is a rare instance of recovery. A Mohammedan coachman, fifty years old, was operated upon for glaucomatous cataract. There were ciliary injection, shallow anterior chamber, steamy cornea, T. plus 2, ripe cataractous lens with good projection of light. The operation was performed under chloroform; cocaine and adrenaline being applied locally. The section was sclerocorneal with a large conjunctival flap; iridectomy-dialysis was performed, and after

expression of the lens the anterior chamber was irrigated. Removal of some blood clots from the anterior chamber with iris forceps led to loss of vitreous.

The same evening, about six hours later, the dressings were found soaked with blood, and severe pain was experienced. The wound was bulging and the conjunctival sac was full of blood clots which were removed. The next day the dressings were soaked with blood, and for a week the wound bulged and serum oozed from it. The wound had healed ten days after the operation, but the pupil was occluded.

Five months later iridotomy was carried out and the resulting vision was $\frac{5}{40}$. The patient could see the eye of a needle with plus 16 D.

We suggest that in such cases it is wiser to reduce the tension by a preliminary iridectomy before proceeding to extraction.

T. HARRISON BUTLER.

ROURE (45, **How I should like to be operated on for a cataract**) recommends very warmly the inferior incision and iridectomy for cataract extraction. The advantages are that it is easier for the patient to look up, and for the operator to handle the instruments. In case of loss of vitreous the extraction of the lens with the spoon is very much easier. If cortex is left behind it settles in front of the coloboma so that the pupillary area remains clear. The author's experience with this method of extraction during the past three years has convinced him that a number of cases which went wrong when he used the superior incision would have been successful if the inferior incision had been used.

SCHOENBERG.

Although this peculiar form of cataract has been described, VERHOEFF'S (46, **Microscopic findings in a case of coralliform cataract**) case is the only one which has been examined microscopically. His patient was 39 years old and had first noticed failing vision at the age of ten. In each eye, ramifying outward from the anterior and posterior cortex were irregular crystalline formations, the remaining lens being clear. There was evidence of degenerative changes about the crystals showing vacuolization and fragmentation. The exact nature of the crystals is not known. Their insolubility in either excludes

the possibility of their being cholesterine. Other reactions exclude hæmoglobin and all organic salts. The most plausible theory is that the crystals are protein which occurs in plants but which has never before been observed in animal tissue. They are probably produced by some metabolic change rather than by degeneration in the lens itself.

ALLING.

XIV.—SYMPATHETIC OPHTHALMIA.

47. ICHIKAWA, K. **Spindle-like formations in the inflamed uveal tissue of sympathetic ophthalmitis.** *American Journal of Ophthalmology*, January, 1919.

ICHIKAWA (47, **Spindle-like formations in the inflamed uveal tissue of sympathetic ophthalmitis**) describes a spindle-shaped body which he has found in five out of seven eyes enucleated for sympathetic ophthalmia and which he has never seen in eyes destroyed by any other form of inflammation. They occurred in intimate connection with eosinophile leucocytes. He is inclined to think that they may be formed by crystallization of the eosinophile granules and is quite positive that they are not artefacts. He does not assert that these bodies are of any importance in the etiology of sympathetic ophthalmia.

ALLING.

XV.—GLAUCOMA AND INTRAOCULAR TENSION.

48. MAGITOT, H. **Some traumatic variations of ocular tension.** *Annales d'oculistique*, cliv., 11.

49. MAGITOT, H. **Two types of modifications of ocular tension, traumatic in origin.** *Ibid.*, clv., 2.

50. MORAX, V. **Clinical observations on a few signs of atypical subacute glaucoma.** *Ibid.*, clv., 2.

MORAX (50, **Clinical observations on a few signs of atypical subacute glaucoma**) calls our attention to those cases of incipient, latent glaucoma complaining of troubles not mentioned in literature as belonging to the symptomatology of the disease. He reports the history of two patients, whose sole complaint was a pain in the orbit and face. Tonometry revealed marked increase of ocular tension, while the eyes were otherwise normal in every respect. Two other patients with apparently normal eyes complained of lacrimation, and their

ocular tension was also found much above normal. All patients were relieved by the use of myotics.

SCHOENBERG.

MAGITOT (48, **Some traumatic variations of ocular tension**) reports a number of observations on patients with a disturbance of ophthalmotonus and draws the following conclusions: (1) The ocular tension depends upon and is regulated by the degree of fullness of the uveal blood-vessels. The angle of the anterior chamber and the aqueous have nothing to do with the ocular tension. (2) A distinction has to be made between the general and local ocular circulation. Under local circulation the author designates that which is constituted by the orbital arteries and veins and by the choroidal blood-vessels. Furthermore the local circulation is to be divided in two zones: the extraocular (containing the ciliary arteries and veins) and the intraocular zone (the uveal blood-vessels). The ocular tension is depending upon the local rather than upon the general circulation. The intrabulbar zone (the uveal blood sponge) constitutes the main factor regulating the intraocular pressure. The blood pressure in the uveal vessels is automatically controlled by the nervous elements scattered in the uvea; these elements belong to the sympathetic nervous system and regulate the amount of dilatation of the uveal blood-vessels independently of the general circulation. These nerve cells innervate the walls of the blood-vessels and receive two sets of fibers: constrictor and inhibitory. The constrictor fibers contract the blood-vessels; the inhibitory fibers produce a vasodilatation. He classifies the cases reported in two groups: those in which the lesion consisted of an inquiry or hemorrhage outside the eyeball, interfering with the return ocular circulation and thereby causing an increase of tension; and those in which the trauma had its greatest effect upon the eyeball itself. In some of these cases the tension was above, in other cases below normal. The explanation how a trauma of an eyeball may produce in some cases a hyper- in others a hypotension is given by the author in the following manner. Trauma may act as an excitant of the nervous elements of the uvea and a vasoconstriction with hypotension is the result; or it may paralyze the nervous elements, and vasodilatation with hypertension is the consequence. SCHOENBERG.

MAGITOT, H. (49, **Two types of modifications of ocular tension, traumatic in origin**) is convinced that the ocular tension is determined by the local circulation in the eyeball itself. He found that the modification of ocular tension, due to trauma, are of two distinct types: passive and active. In the passive types there is an increase of tension produced by other factors than those disturbing the nervous apparatus which acts automatically as the regulator of the ocular circulation and ocular tension. These factors are extraocular; they are to be sought in the orbital tissues, outside the eye, acting upon the veins (vorticose and orbital veins). The active type is produced by a functional disturbance of the neuro-autonomic regulator of the eyeball. This functional disturbance will cause a hyper- or hypotension according to what happens to the choroidal vessels: distension or spasm, excitation or a paralysis of the vasomotor elements. The author reports two cases illustrating these two types.

Case 1 regards that of a soldier 24 years old who after a severe fall was found to have a hæmatoma of both orbits and face and an ocular tension of 95*mm* (Schiotz). The tension dropped in jerky manner to normal during the following eight days. The interesting points about this history are that in spite of the high tension there was no disturbance of visual acuity or of retinal circulation; the field of vision was not contracted; the cornea was not hazy; the patient complained of no pain at any time and the pupils remained normal in size and reactions. The author thinks that this case is quite a flagrant contradiction to our current ideas about the pathogenesis of mydriasis, pains, and visual field contraction in glaucoma.

Case 2. A patient, 25 years old, with a small fracture of the left orbital margin gets an attack of subacute glaucoma of the left eye thirteen days after the accident. The tension, 80*mm* (Schiotz), responds promptly to pilocarpin by descending to 20*mm*, but raises again to 38*mm* when pilocarpin is discontinued and later on to 50–60*mm*. Finally after the use of adrenaline-cocaine drops it descends quite suddenly to and oscillates between 22 and 60*mm* (Schiotz). The tension always remained independent of the general blood pressure and as in Case 1 was always higher mornings than evenings. The author considers this case as an active type due to a commo-

tional disturbance of the function of the neuro-autonomic apparatus, regulating the choroidal circulation. In this case, in contradistinction to Case 1, we find a paretic pupil, pains, and visual disturbance.

SCHOENBERG.

XVI.—THE RETINA AND VITREOUS.

51. DUNCAN, R. **Glioma of the retina with report of three cases treated with radium.** *American Journal of Ophthalmology*, October, 1918.

52. HARDY, W. F. **The vitreous and its replacement after loss.** *Transactions American Ophthalmological Society*, 1918.

53. JERVEY, J. W. **Hyperplastic exudative retinitis, non-hemorrhagic.** *Ibid.*, 1918.

DUNCAN (51, **Glioma of the retina**) cites three cases and draws the following conclusions. All eyes with glioma should be enucleated at once and the orbit should be treated with radium to prevent recurrences. In recurrent cases radium offers the most effective method of treatment.

ALLING.

JERVEY (53, **Hyperplastic exudative retinitis**) uses four cases of organized retinal exudate as the basis for his thesis. In none of his cases was there any evidence of hemorrhage. He therefore suggests a clinical type to be designed by the title of his paper. He would include also retinitis circinata and retinitis proliferans of non-hemorrhagic origin as belonging to this category. The pathogenesis of his cases is evidently vascular and the tissue is analogous to granulation or chronic inflammatory tissue. Though not of this nature the lesions resemble those of syphilis, tuberculosis, or traumatic origin.

ALLING.

HARDY (52, **The vitreous and its replacement after loss**), experimented upon rabbits to prove the following propositions: (1) That the vitreous when lost is never regenerated as such. (2) That immediately after loss the vitreous is replaced by an albuminous fluid similar to the so-called emergency aqueous. (3) That the ciliary processes after vitreous loss show definite changes. These are thickening of the processes due to the engorgement of capillaries, an apparent lengthening of the convoluted formation so that the processes lie against the capsule of the lens and the formation of blisters—Greeff cysts.

The character of the fluid replacing the vitreous and the changes in the ciliary processes are evidently the result of the disturbed ratio between the intraocular and the endovascular tension—a product of disturbed physiology.

ALLING.

XVII.—THE OPTIC NERVE.

54. GOLDENBURG, M. **Tower skull with double optic atrophy.** *American Journal of Ophthalmology*, November, 1918.

55. ZENTMAYER, WM. **Concerning the ætiology of hereditary optic atrophy. Report of two cases with interesting X-ray findings.** *Transactions American Ophthalmological Society*, 1918.

GOLDENBURG'S (54, **Tower skull with double optic atrophy**) report is accompanied by Roentgenographs which show the skull of his case to be thickened irregularly with depressions on the inner table undoubtedly formed by the convolutions of the brain. The suture lines cannot be demonstrated but the grooves of the meningeal vessels are very marked. The findings lead to the conclusion that there was premature ossification causing internal hydrocephalus and increased intracranial pressure. The child when born had nasal obstruction, prominent eyes, and seemed to be blind. There were nystagmus and gray atrophy of the optic nerves.

ALLING.

ZENTMAYER (55, **Ætiology of hereditary optic atrophy**) relates the histories of two families in which this affection appeared.

The X-ray showed in each of the four affected members an enlarged pituitary fossa on the border line of the normal. He is of the opinion that our data are insufficient to draw definite conclusions as to the relation of the pituitary body to these cases.

ALLING.

XVIII.—ACCIDENTS, INJURIES, AND PARASITES.

56. CORIAT, M., and BOULAI, M. **A case of bilateral metastatic ophthalmia following a war injury.** *Archives d'ophtalmologie*, xxxvi., 3.

57. DOR. **Traumatic hemeralopia.** *Clinique ophtalmologique*, viii., 10.

58. DUVERGER, M. **A few symptoms peculiar to injuries of the posterior segment of the eyeball.** *Archives d'opthalmologie*, xxvi., 3.

59. FRENKEL, H. **The syndrome of trauma of the anterior segment of the eye.** *Annales d'oculistique*, clv., 2.

60. FROMAGET, H. **Remarks on an army service of oculo-orbital surgery.** *Archives d'ophtalmologie*, xxxvi., 3.

61. HINE, M. L. **The recovery of fields of vision in concussion injuries of the occipital cortex.** *British Journal of Ophthalmology*, January, 1919.

62. TERRIEN, F., and COUSIN, G. **Prevention of war injuries of the eye by a new model of a mask.** *Archives d'ophtalmologie*, xxxvi., 3.

Captain HINE (61, **The recovery of fields of vision in concussion injuries of the occipital cortex**) records the results which he has obtained from the examination of five patients who had received concussion injuries during the war. The examinations were made in France at a Base Hospital. A bruising of the cerebral cortex has been taken to be the pathological basis of the clinical condition known as "concussion."

Three of the cases had definite fracture of the skull, and were seen at operation to have either subdural or extradural blood clot, the dura itself being intact. In two there was no demonstrable fracture of the skull although there were scalp wounds in the occipital region. A hand perimeter was used to examine the fields, and a ten millimeter white object was employed. When the condition of the patient allowed him to get up, smaller objects were used, and the Bjerrum screen was used to define the macular scotoma.

The following conclusions were suggested by the study of these cases—conclusions which agree with those come to by Colonel Lister, and Lt. Col. Gordon Holmes.

(1) In the case of an injury at or near the occipital pole the hemianopsia is frequently complete. There is not the tendency to macular escape which is noted in civil cases of hemianopsia.

(2) The visual fields are gradually restored by recovery from center to periphery. It may be noted that a scotoma produced by loss of cerebral substance contracts from periphery to center as the surrounding brain œdema subsides.

(3) The field of vision usually returns in the upper quadrant before the lower, and in Hines's experience never in the reverse sense. This is due to the fact that the injuries were all above the occipital pole. Hence the occipital cortex above the calcarine fissure, which represents the lower field of vision, has borne the brunt of the blow. An injury below the occipital

protuberance is much more likely to be fatal wooing to the proximity of the cerebellum and the medulla. For this reason it is rare to get a case which shows a superior quadratic macular defect.

(4) The restoration of vision is at first incomplete, but after it has commenced it proceeds in a definite order. Color perception comes after the appreciation of white even though the colored object be the larger. With the march of recovery smaller and smaller colored objects are recognized.

T. HARRISON BUTLER.

CORIAT and BOULAI (56, **Bilateral metastatic ophthalmia following a war injury**) report the history of a case in which septicæmia and endocarditis developed three months after an injury in the sacrolumbar region. Two weeks before death a metastatic ophthalmia appeared first in one eye, a few days later in the other.

SCHOENBERG.

DOR (57, **Traumatic hemeralopia**) has seen three cases of hemeralopia following trauma. The third case, reported in this paper, was that of a soldier who was struck on the head by the falling roof of a house that caved in. He sustained a fractured skull, and after recovering consciousness he was blind for about ten days. The blindness gradually disappeared and vision reached $\frac{3}{5}$ in each eye in the course of a month. The fundus, fields, and pupillary reflexes were normal, but the patient remained unable to see in the dark. The author raises the question whether hemeralopia can be produced by a lesion outside of the retina, in the optic fibers or the external geniculate ganglia.

SCHOENBERG.

DUVERGER (58, **A few symptoms peculiar to injuries of the posterior segment of the eyeball**) thinks that among the characteristic symptoms of a perforating injury of the eyeball, located behind the ciliary body, the most important for diagnosis is the peculiar appearance of the anterior chamber and of the iris. The loss of vitreous causes a receding of the lens, the anterior chamber becomes deeper, and the periphery of the iris appears to have undergone a bent of 90 degrees, so that it is in an antero-posterior instead of a facial plane. This appearance of the iris, together with a deepening of the anterior

chamber and lack of iridodonesis, is more helpful to make the diagnosis than other symptoms, like the presence of the conjunctival loss of substance, of vitreous in the wound, immediate noninflammatory chemosis, and lower tension, because some or all of these may be absent while the appearance of the anterior chamber as described above is always present. A report of six cases illustrates the author's contention.

SCHOENBERG.

FROMAGET (60, **Remarks on an army service of oculo-orbital surgery**) relates his experience in a French hospital in which only soldiers with injuries of the eye and orbit were treated. The most difficult problem was the diagnosis and removal of intraocular foreign bodies, on account of lack of facilities for radiography. Besides, since the patient has to keep the injured eye quiet by fixing an object with his good eye, very often the radiography could not be done even when the means for this examination were obtainable. Finally Jaugea's method overcame this difficulty and radiograms gave very satisfactory results. The method consists of fixing on each extremity of the vertical meridian of the cornea of the injured eye a grain of lead. The eyes are closed and bandaged so as to keep them quiet and two radiographs are taken: one frontal and one lateral. A circle of *26mm* diameter posteriorly and tangential to the two shadows of the grains of lead on radiogram gives a correct lateral projection of the eye. The frontal projection is obtained by uniting the two shadows by a line and drawing a circle through them using this line as a diameter.

SCHOENBERG.

FRENKEL (59, **The syndrome of trauma of the anterior segment of the eye**) enumerates the various symptoms and changes noticed by him in sixty-six cases of contusions of the anterior segment of the eyeball. He characterizes and classifies them in: (1) periocular injuries; (2) absence of corneal or scleral lesions; (3) subluxations of the lens with pupillary changes; (4) iridodialysis or rupture of the iris; (5) traumatic cataract (partial and stationary); (6) diminution of visual acuity out of proportion with the visible lesions.

SCHOENBERG.

TERRIEN, F., and COUSIN, G. (62, **Prevention of war injuries of the eye by a new model of a mask**) have found that

very small particles of projectiles have caused complete loss of vision in 89 per cent. of eye injuries. They describe a new model of a mask made of metal which can protect very effectively the eyes and face from flying pieces of metal. The picture of this device should be seen in the original.

SCHOENBERG.